the OIL AND GAS JOURNAL

FRANKS MFG. CORP. WELL SERVICING AND DRILLING UNITS

*Junior Clipper**

( ) Self-Propelled

( ) Needs No Guy Wires to Ground

( ) Stabilized with 15 ft. Spread Derrick Out Riggers

( ) 100% Remote Control with Franks Telemech

( ) Automatic Telescoping Derrick Extending Lock

( ) Automatic Lowering and Raising of Stacking Board

( ) Provision for Hydraulic Tubing Tongs

( ) Light Weight Complete Rig

( ) Heads into Location, Instead of Backing in

( ) Doubles Derrick Hydraulically Raised and Extended

*Check the Features you like about Franks Clipper.

The Latest Approach to *HIGHWAY LEGALITY* In a Self-Propelled Complete Unit

Why You Get More Contracts With a Franks Unit . . . . .

In well servicing its the end results that count—results for both contractor and company. Many companies are paying contractors more per hour to use Franks units, because these companies know they get faster rig-up and down, faster pulling, and, therefore, pay less in the end. Contractors also find this advantageous for they can keep their Franks units busier and therefore get more contract work in the end. Contractors also benefit from the Franks faster moving and from Franks exclusive "on the spot field service" which eliminates excessive repair time out. Then, too, contractors benefit further because they never have a Franks idle in their yards waiting for a more preferred unit to come in from another job. Franks, being preferred by superintendents, is in constant demand. This all adds up to the fact that Franks costs less in the long run, both to contractors and companies. Franks is Not *Among* the Best, But *The* Best. Investigate Franks before you buy.

FRANKS MFG. CORP. TULSA, OKLAHOMA

"on the SPOT" FIELD SERVICE

Franks Mfg. Corp.
Box 3218, Whittier Station,
Tulsa, Oklahoma

Only FRANKS offers "on the spot" field service with stock of parts and factory trained personnel available at Alice, Compton, Casper, Great Bend, Houston, Kilgore, Odessa, Seminole, Edmonton, and Tulsa. Export: 149 Broadway, New York.

Franks features reveal why superintendents prefer Franks and contractors make money using them

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 **NOVEMBER 30, 1953**

Workshops...

for the Petro-Chemical Industries

HOUSTON PLANT

DALLAS PLANT

Wyatt's

HOUSTON-DALLAS-NEW YORK-TULSA

STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913

the OIL AND GAS JOURNAL

NOVEMBER 30, 1953 VOL. 52 NO. 30

OIL IN THE NEWS . . .

Texas Is Winning Its Battle Against Waste in Flaring Natural Gas 40
Good Maintenance on Meters Is Essential to Accurate Measurement 41
Conference to Tackle "Resources of Future" in Washington This Week 42
Drilling Activity Continues Upward Trend With Record in Rigs Running 43
Question of Gas Flow Across U. S.-Canada Border May Get Study 44
Plant Use of Corrosion Inhibitors Expected to Become Standard 45
Stock Buildup on West Coast Slowing Substantially, Agency Says 46
Commission Hears Pro and Con Arguments on Imports 47
Leasing Regulations for Outer Shelf to Be Issued Soon 47
Tidelands Swap Between Government, Texas Under Study 47
NPC Will Hold Final Meeting This Week 48
Effects of Latin American Imports to Be Aired This Week 48
Interior Department's Oil and Gas Division May Succeed PAD 48
ODM Enforces Construction Time Limit on Amortized Projects 49
Transcontinental Gas Plans $80,000,000 Expansion Program 49
Gulf Interstate's 860-Mile Gas Line Nears Halfway Point 50
Details of McCarthy's Bolivian Concession Contract Revealed 51
Basrah Finds Oil on Rumaila Structure in Southern Iraq 52

NEWS FEATURES . . .

They Say 26
Calendar of Events 30
Journally Speaking 35
Editorial 37
This Week 39
International News 51
Personals 57
Deaths in the Industry 59
Pipe-Line News 127
Natural-Gas News 129
Natural-Gasoline News 129
Refining News 130
Petrochemical News 132
Exploration Statistics 163
Production Statistics 164
Refining Statistics 165
Market Statistics 166

TECHNOLOGY AND OPERATION . . .

[1]Natural Gas to Alcohol at Tuscola 60
Staff Report
Problems Licked in Tuscola Startup 64
By J. F. McDonald
[2]Progress Report: Water Flooding the Golden Lane 65
By Ed McGhee
[3]Why Prestressed Concrete in the Refinery? 78
By J. S. Bell and D. R. DeVeaux
[4]Formation of Martensite in Rotary Drilling Lines 79
By C. M. Zerr
[5]How to Cement-Line Pipe 91
By F. Lawrence Resen
Engineering Reference Section 97-105

DEPARTMENTS . . .

Books 71
Engineering Reference 97
Corrosion Control 99
Field Processing 101
Engineering Fundamentals 103
Refiner's Notebook 105
Equipment Men in News 106
Pipe-Line Construction 110
Equipment Digest 121-170
Classified Advertising 167
Advertisers' Index 171

EXPLORATION . . .

Palo Duro Basin Drilling Next? 139
Wildcat Completions Drop Slightly in October 141
Completions Hit Record High 143

FIELDS . . .

Active Rotary Rigs 43
Drilling Contractors 135
Area Field Reports 144

In Brief . . .

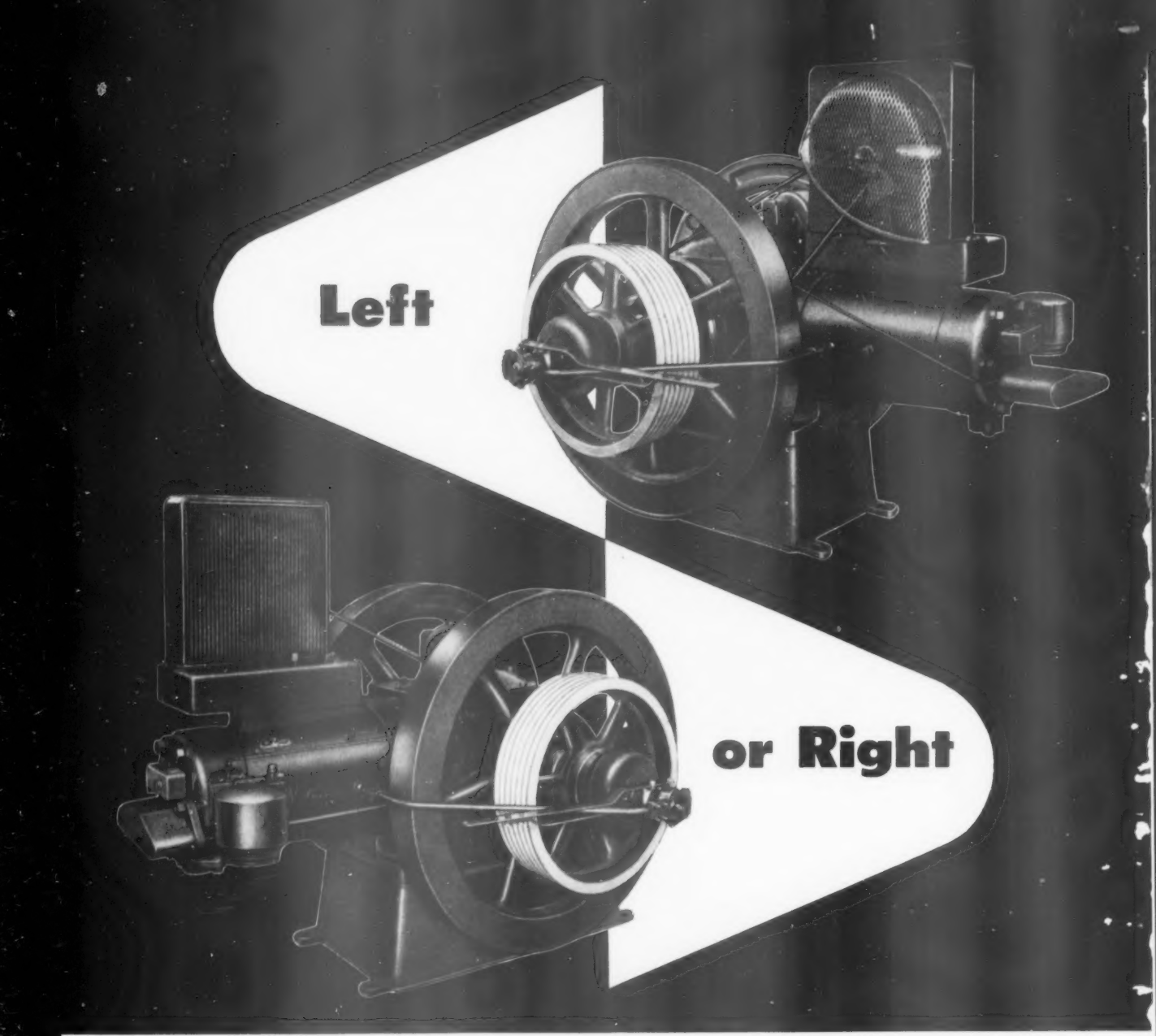
1. MORE PETROCHEMICALS . . . At Tuscola, Ill., National Petro-Chemical Corp. operates an extraction-fractionation plant for the production of liquid petroleum gas from 400 million cubic feet per day of Panhandle gas. This has been in operation since July. Other units in the plant are: (1) A 325-ton per day ethylene plant; (2) an alcohol unit; and (3) an ethyl chloride unit. The first two chemical units are currently being started up, and production is expected from the ethyl chloride plant in December.

2. WATER FLOODS ON DISPLAY . . . Greenwood County, Kansas, has more than 50 presently active water-flood projects that are producing in excess of 16,000 bbl. of oil per day. Shallow sand stringers lend themselves to flooding to make the area one of the most successful secondary-recovery centers of the Mid-Continent. Three projects visited by the annual water-flood group furnish a picture of the "Golden Lane's" operations.

3. REDUCED MAINTENANCE . . . Maintenance costs in most refineries can be materially slashed by judicious use of prestressed concrete construction. Advantages of this type of construction include: (1) Saving of metallic materials of construction, and thereby avoiding delays due to lack of supply; (2) saving of space in tank farms; (3) adequate shock resistance can be provided; (4) fire resistance is high; and (5) maintenance costs are lowered. Disadvantages include: (1) Lack of versatility; (2) construction difficulties; and (3) repairs are difficult to make.

4. DRILLING PROBLEM . . . Formation of martensite in rotary drilling lines is caused by rapid heating and cooling of the line while in operation. Martensite is characterized by extreme hardness and internal stresses, and by the brittle characteristics it imparts to the line. The cutoff procedure seems to be the best answer to this problem. Notches started by martensite should not be allowed to cause wire fractures. The rope must be cut carefully so that the pickup point in one setting will not become the pickup point at any future setting.

5. CORROSION RESISTANCE . . . Pipes handling highly corrosive molten sulfur and water mixtures are being cement-lined at Freeport Sulphur Co.'s Freeport, Tex., plant. The lining has proved so practical that it is being used in water lines as well. It is applicable for most corrosive services, and especially those where an excessive amount of piping is involved. Cost of a pipe-lining plant is $5,000 to $7,000.



is right with the "ZC"

With a Fairbanks-Morse *"ZC"* Engine on your pumping rig, you can mount your clutch and sheave on either the *right* or *left* side of the engine. It's a big convenience feature that makes it easy for you to mount the engine where *you* want it on your pumping jack.

The TWO big flywheels of the *"ZC"* make this feature possible and give you the important flywheel effect on each side of the engine for smooth operation and economical performance.

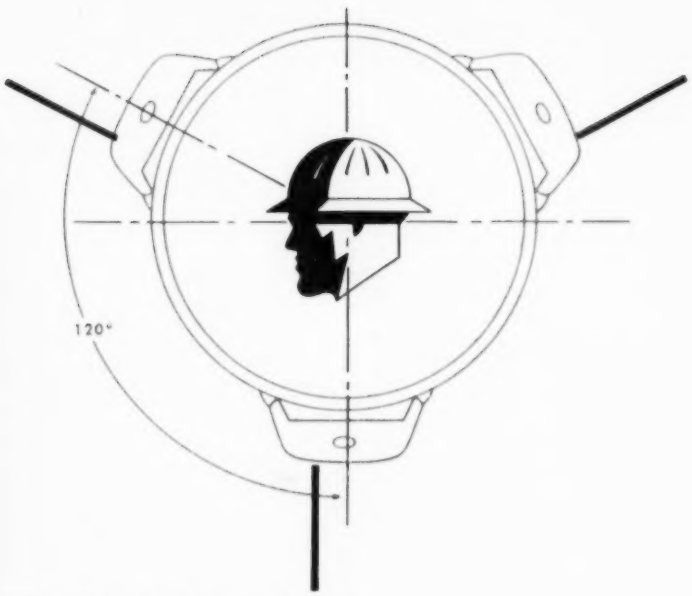
The Fairbanks-Morse Type "J" clutch and sheave assembly are ruggedly built units with extra heavy friction plates and contact parts to prevent distortion and assure uniform pressure at all times.

For the complete story on the *"ZC"* . . . *the engine with the big double wheels,* see your local supply store or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

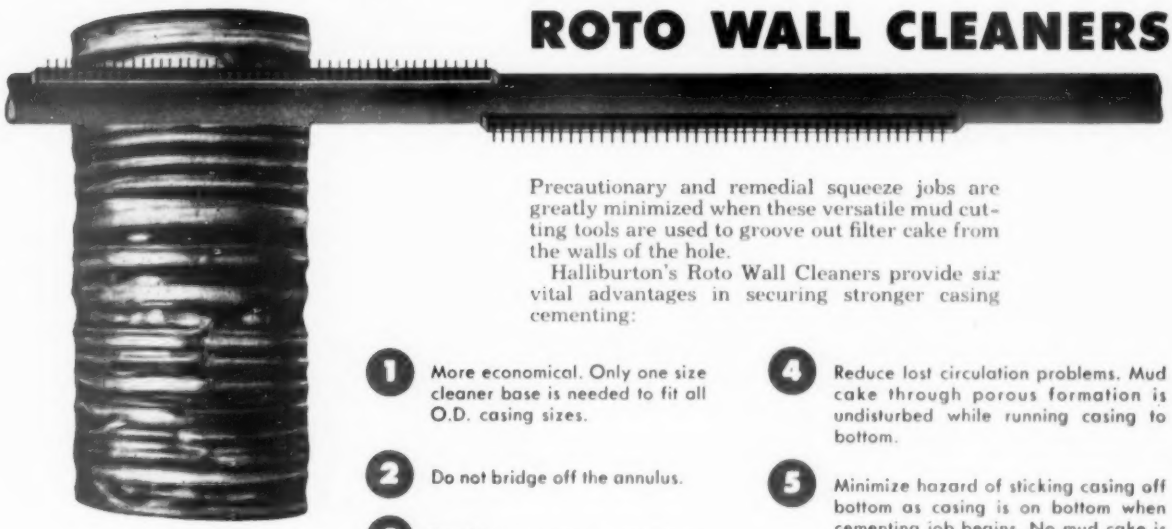
FAIRBANKS-MORSE,
a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES • ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS • DIESEL LOCOMOTIVES

SIX GOOD REASONS WHY MORE OPERATORS USE



HALLIBURTON'S ROTO WALL CLEANERS



Precautionary and remedial squeeze jobs are greatly minimized when these versatile mud cutting tools are used to groove out filter cake from the walls of the hole.

Halliburton's Roto Wall Cleaners provide *six* vital advantages in securing stronger casing cementing:

1. More economical. Only one size cleaner base is needed to fit all O.D. casing sizes.
2. Do not bridge off the annulus.
3. Provide an open passageway for free fluid flow while running casing, circulating or cementing.
4. Reduce lost circulation problems. Mud cake through porous formation is undisturbed while running casing to bottom.
5. Minimize hazard of sticking casing off bottom as casing is on bottom when cementing job begins. No mud cake is removed until casing is rotated.
6. They distribute cement around casing more uniformly by rotating action of the spring steel spikes.

It's no wonder that *more* operators are calling for Halliburton's Roto Wall Cleaners when they want a strong primary casing cementing job. They find it's a most valuable low-cost investment. Phone your nearby Halliburton representative for Roto Wall Cleaners and get these *six* big benfits. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN IMPROVED CEMENTING TECHNIQUES!

it's AMERICAN

any way you figure it...

Yes, there is an American Pumping Unit to fit *your* needs. American Pumping Units, from the husky T5 to the giant T27, are engineered to do a *specific* job. There is an American Pumping Unit for *every* job—for every well. The new American Pumping Units have adjustable cranks that make it an easy one-man job to adjust the counterbalance. Any way you figure it, it's more profitable to specify and use American Pumping Units.

AMERICAN
MFG. CO OF TEXAS
FORT WORTH 11, TEXAS

- Odessa
- Tulsa
- Kilgore
- Houston
- New York
- Calgary, Alberta, Canada

LUBRICATE PLUG VALVES

in seconds — instead of minutes

with this timesaving combination

Yes, seconds are all it takes to lubricate plug valves, today. You'll eliminate waste, and save time and effort with this combination: Walworth High Pressure Lubricant Gun, Walworth Button-Head Fittings, and Walworth Jumbo Size Lubricant Sticks. They'll pay for themselves quickly and are adaptable to most of the lubricated plug valves that are in use today.

Walworth High Pressure Lubricant Gun. This is the only gun available today that satisfactorily handles the stick form, full-bodied lubricants needed for proper lubrication and sealing of plug valves. Easy to operate; two Jumbo Size Lubricant Sticks fill the barrel.

Walworth Jumbo Size Lubricant Sticks. Individually wrapped and packed ten to the box; clean and easy to handle . . . eliminate messy loading. Types available for most line fluids. Always use Walworth Lubricants in Walworth Lubricated Plug Valves.

Walworth Button-Head Lubricant Fittings. Use them as lubricant fittings or as regular lubricant screws with standard size lubricant sticks. Just slip hose coupling onto fitting for a leakproof connection.

Start saving today . . . call your nearby Walworth Distributor. He'll be glad to supply Walworth High Pressure Lubricant Guns, Button-Head Fittings, and the right Jumbo Size Lubricant Sticks for any lubricated plug valve service condition.

WALWORTH

Manufacturers since 1842

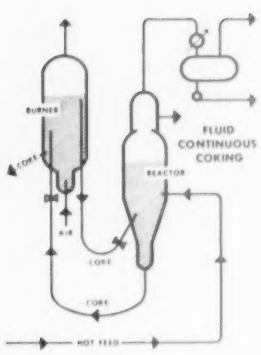
valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

The Oil and Gas Journal, published Mondays, copyright 1953, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

FLUOR
will build the
WORLD'S FIRST FLUID COKER



FLUID COKING

Fluid Coking is a continuous coking process, recently perfected by the Standard Oil Development Company after four years of research. Heavy residual fractions can be cracked for higher yields of light products — far beyond the limits of delayed cokers. Fluid cokers supply their own heat, no furnace is required, coke yields are less and over-all costs are lower. For details on Fluid Coking, contact your Fluor representative.

FOR IMMEDIATE RELEASE:

"BILLINGS, MONTANA,... CONTRACT FOR A NEW FLUID COKING UNIT, FIRST COMMERCIAL INSTALLATION OF ITS KIND IN THE WORLD AND A PROCESS WHICH WILL GREATLY INCREASE THE GASOLINE, TRACTOR AND DIESEL FUEL OUTPUT AT THE CARTER OIL CO. REFINERY HERE, HAS BEEN LET TO THE FLUOR CORPORATION, I. J. STAID, MANAGER OF MANUFACTURING FOR CARTER, ANNOUNCED TODAY.

"WHILE ACTUAL CONSTRUCTION OF THE NEW UNIT WILL NOT BEGIN UNTIL SPRING, ASSEMBLING OF MATERIAL AND DETAILED ENGINEERING WORK WILL GET UNDERWAY IMMEDIATELY...STAID INDICATED THE UNIT IS THE FIRST STEP IN EXTENSIVE MANUFACTURING DEPARTMENT EXPANSION... THE CARTER UNIT PROBABLY WILL BE COMPLETED AND READY FOR OPERATION BY OCTOBER OF 1954."

BE SURE WITH

FLUOR

THE FLUOR CORPORATION, LTD.
LOS ANGELES 22, CALIFORNIA

FOREIGN: FLUOR PARIS
FLUOR OF CANADA, TORONTO
FLUOR INTERNATIONAL, BEIRUT
FLUOR PERUANA, S.A., LIMA
HEAD WRIGHTSON, LONDON

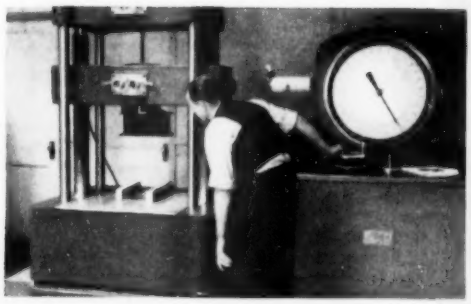
ENGINEERS
CONSTRUCTORS
MANUFACTURERS

NEW YORK
CHICAGO
PHILADELPHIA
BOSTON
PITTSBURGH
SAN FRANCISCO
HOUSTON
BIRMINGHAM
TULSA

Why Grinnell is America's #1 Supplier of PIPE HANGERS *and* SUPPORTS

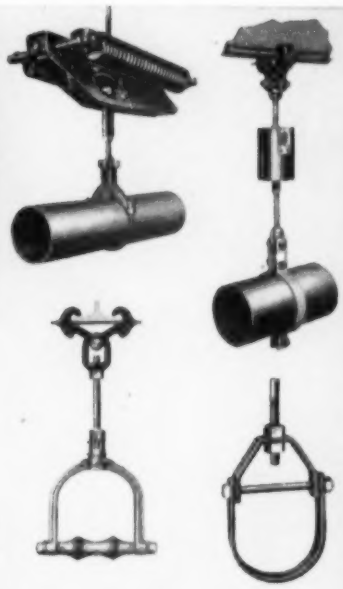
GRINNELL, ALONE, MANUFACTURES A FULL LINE OF HANGERS AND SUPPORTS

No other company, anywhere, makes a line as complete or varied. Grinnell produces hangers in thousands of combinations to support any piping.



GRINNELL, ALONE, MAINTAINS AN EXPERIENCED LABORATORY STAFF OF TRAINED TECHNICIANS

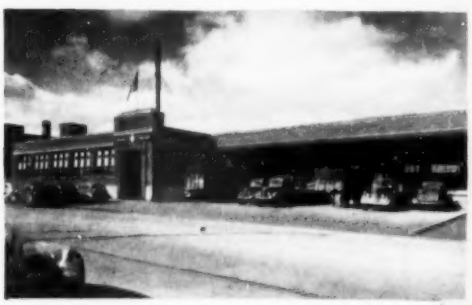
In its modern, well-equipped laboratory, tests are constantly being made to discover better ways of solving old and new pipe suspension problems.



Grinnell makes scientifically designed, ruggedly built pipe hangers and supports for every type installation.

GRINNELL, ALONE, PROVIDES ENGINEERING ASSISTANCE IN DESIGN AND INSTALLATION

Grinnell makes available specialized knowledge in the computation of hanger loads and the selection of the correct supports. Engineers in the field assist with problems in erection of pipe hangers.



GRINNELL, ALONE, THROUGH ITS CONVENIENT WAREHOUSES CAN SUPPLY YOU "OUT OF STOCK"

No manufacturer of pipe hangers offers a distribution system as thorough or efficient. Grinnell warehouses are located in 30 principal cities . . . with jobbers in practically every city, coast to coast.

Pipe suspension presents an extremely wide range of problems involving weights, stress, thermal movement, materials and specialized engineering. No one "goes into" the pipe hanger business overnight. Large manufacturing facilities, skilled technicians, and a lot of down-to-earth practical experience are needed.

Grinnell has become America's No. 1 supplier of pipe hangers and supports only because Grinnell has specialized in piping for one hundred years. Grinnell has developed a line of pipe hangers and supports for every piping requirement, from the simplest to the most complex.

Grinnell is always ready to co-operate with engineers and architects in the preparation of pipe suspension specifications.

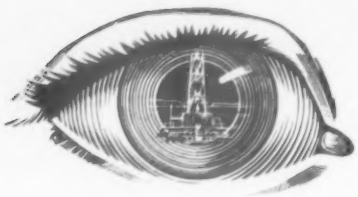
Call Grinnell for any and all types of pipe hangers and supports.

GRINNELL

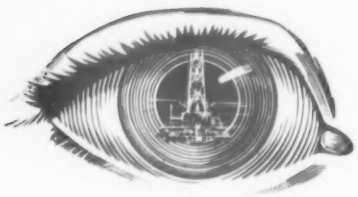
WHENEVER PIPING IS INVOLVED

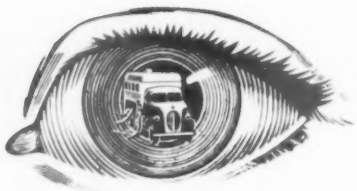
Grinnell Company, Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports
Thermolier unit heaters • valves • Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies • industrial supplies
Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems



drill...





with both eyes open!

Use Core Lab's Well Logging Service . . . . Each foot drilled is logged for drilling time . . . Cuttings are minutely analyzed for hydrocarbon concentration indicating oil and gas . . . Gas concentration in drilling mud is measured continuously to reduce the possibility of blowouts . . . Physical characteristics of mud (weight, viscosity, water loss) are measured each tour . . . Data on cuttings and mud are plotted versus depth for interval logged . . . Stray pays are picked up when encountered, while anticipated productive zones are pin-pointed without unnecessary "pre-coring". The same Core Lab crew and portable equipment are immediately available to perform On-Location Core Analysis at no extra charge. *Drill with both eyes open. Drill with Core Lab's Well Logging Service.*

CORE LABORATORIES, INC. ● IN ALL ACTIVE AREAS

Dallas, Houston, Corpus Christi, Midland, Abilene, San Antonio, Tyler, Wichita Falls, Lubbock, Oklahoma City, Ft. Worth, Great Bend, Shreveport, Lafayette, New Orleans, Natchez, Bakersfield, Denver, Sterling, Worland, Williston, Billings, El Dorado, Hattiesburg, Farmington, Lovington, Calgary, Edmonton.

CORE LAB
WELL LOGGING SERVICE

EASY HANDLING— FULL FLOW— TROUBLE-FREE OPERATION—

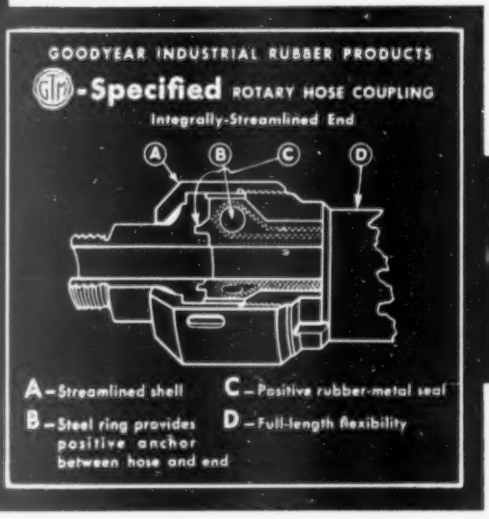
You get ALL THREE with the Exclusive Goodyear Rotary Hose Coupling that's Oil Field Designed

The exclusive Goodyear integrally-streamlined Rotary Hose connection was designed by the G.T.M.—Goodyear Technical Man—to meet rigid oil field specifications. They include full free flow, full-length flexibility of hose, and excellent abrasion resistance—reasons why this connection is giving long, dependable, trouble-free service even under most difficult conditions.

Ask the G.T.M. for details, see your nearest Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Coupling in service. Note absence of projecting clamps.

FINAL INSPECTION at plant. Parts from top to bottom are adapter (note thread protector), shell, retainer.



YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

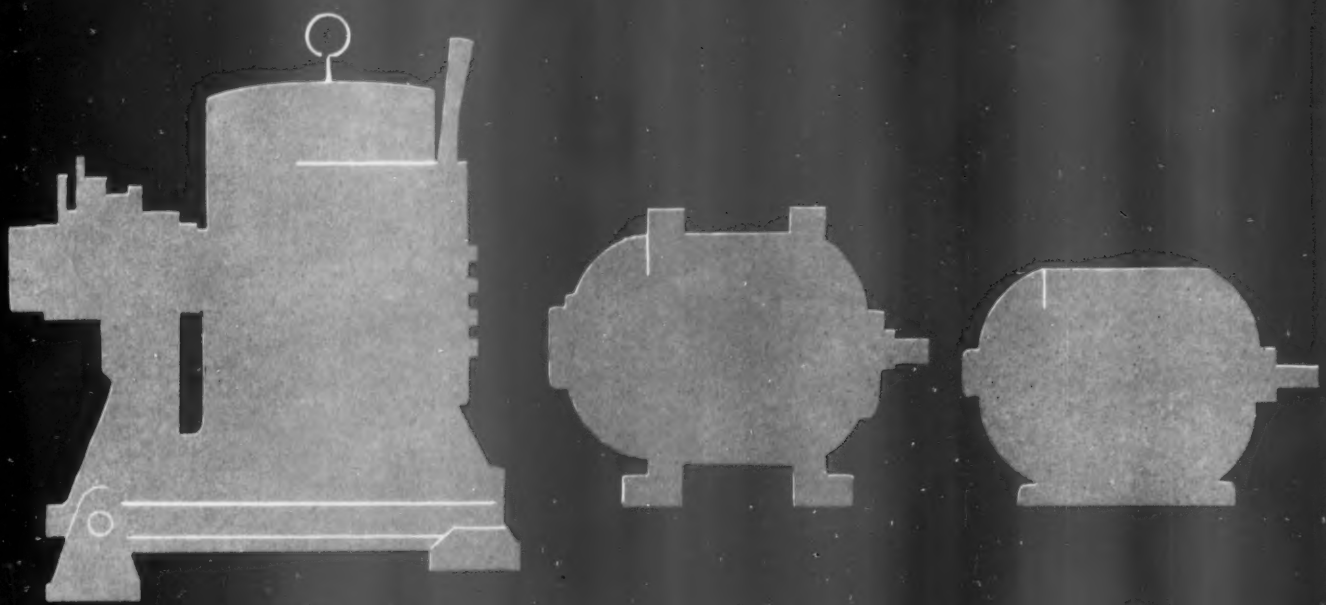
GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

WHAT'S NEW

IN MOTORS



1888
TESLA
5 H.P.
765 LBS.

1926
CS
5 H.P.
130 LBS.

1947
LIFE-LINE
5 H.P.
119 LBS.

IS STILL TO COME . . .

Hear anything about a new motor? Well, if you think you have, let's set the record straight . . . What's New In Motors Is Still To Come!

Westinghouse has been a leader in the designing and manufacturing of motors for over 60 years. During these many years, over 20 million dollars has been spent on the development of basic lines of induction motors to maintain this leadership. Here are the real years of "new motors" in the parade of progress:

1888—*THE FIRST A-C MOTOR—THE WESTINGHOUSE TESLA MOTOR*

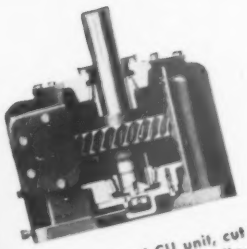
1926—*THE FIRST SEALED SLEEVE BEARINGS—THE WESTINGHOUSE CS MOTOR*

1947—*THE FIRST MOTOR WITH PRE-LUBRICATED BEARINGS PLUS A ⅓ WEIGHT AND SIZE REDUCTION—THE WESTINGHOUSE LIFE-LINE MOTOR*

The smaller, lighter Westinghouse Life-Line Motor of 1947 was the last major contribution. *AND FOR THE NEXT ALL-IMPORTANT STEP AHEAD IN MOTOR PROGRESS . . . LOOK TO WESTINGHOUSE.*

YOU CAN BE SURE.. IF IT'S Westinghouse

J-21834



The Cleveland CU unit, cut away to show large diameter fan shaft, tapered roller bearings on gear shaft and piston type lubricating pump. Cleveland worms and gears, fabricated of specially selected alloys, have high shock resistance.

CLEVELAND drive takes the heat off a gas booster

TAKE a look at a familiar sight. This Cleveland CU worm gear speed reducer is driving a cooling tower fan to take the heat off compressed gas at a Kansas booster station.

Cleveland CUs are familiar in the gas and oil country because they excel at driving heavy-duty fans for long, continuous, trouble-free periods under all weather conditions.

In a Cleveland CU unit, a case-hardened steel worm operates on a long-wearing, nickel-bronze gear. Parts run in an oil bath, sealed in a dust-tight housing. The unit is so well engineered and built that it is practically shockproof and wear-free. Over 40 years of specialized worm gear knowhow stand behind it—experience which pays off in economical cooling of the thousands of Cleveland-driven heat exchangers now operating in the oil and gas industry.

For full description and engineering data, write today for new Catalog 400. The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

climax blue streak engines

PEAK PERFORMANCE WITH POWER TO SPARE . . . that's the reputation of Climax Blue Streak Engines with oil men everywhere. They like Blue Streak's instant throttle response for fast hoisting . . . they like Blue Streak's year to year dependability under continuous heavy loads . . . they like the added convenience feature that permits efficient operation on either Butane or Natural Gas. And for sound, overall economy, they know Climax Blue Streak can't be beat.

Whatever your power requirements may be, it will pay you to check first with your Climax Distributor. He is anxious to explain the many performance qualities of Climax Blue Streak Engines and how his staff of factory trained mechanics assure you of unsurpassed service . . . where you need it and when you need it.

There is a Climax Blue Streak Distributor located within two hours of your operation. His modern, completely equipped shop will provide immediate low cost attention to your every power need.

climax BLUE STREAK ENGINES

Made by CLIMAX ENGINE AND PUMP MFG. CO. Factory and General Offices: Clinton, Iowa. Oil Field Sales Office: 155 Continental Ave., Dallas, Texas.

A Great Line of Aluminum to serve you ...2874 different items in stock

Here, stocked for your convenience, is almost every conceivable aluminum item you could want. The quality is here, too! The entire line's produced by ALCOA—the first and foremost aluminum mill in America.

... And you'll find Metal Goods Corporation's 7 warehouses and 11 sales service offices geared to give you swift, efficient service on any of your Alcoa aluminum needs.

Simplify your aluminum procurement problems. Make one call for all your aluminum requirements. Call your nearest Metal Goods Corporation Representative.

METAL GOODS CORPORATION

DISTRIBUTORS FOR ALUMINUM COMPANY OF AMERICA

OFFICES AND WAREHOUSES

St. Louis 15, Missouri
5239 Brown Avenue
Nelson L. Hower
Phone: GOodfellow 1234

Kansas City 16, Mo.
1300 Burlington
Frank D. Hogan
Phone: NOrclay 3516

Dallas 9, Texas
6211 Cedar Springs Rd.
Sam D. Hodgdon
Phone: ELmhurst 3271

Tulsa 3, Oklahoma
302 North Boston
Scott J. Harrison
Phone: 4-4101

Denver 2, Colorado
2425 Walnut Street
Neal Dehn
Phone: AComa 5891

Houston 3, Texas
711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

New Orleans 12, La.
432 Julia Street
Carl T. Wedemeyer
Phone: CAnal 7373

SALES SERVICE OFFICES

Wichita, Kansas
2200 East Central
Ray Noller
Phone: AMherst 7-8921

Decatur, Illinois
1305 West Sunset
Arlie W. Tempel
Phone: 8-1314

Beaumont, Texas
238 Bowie Bldg.
Lee T. Dodson
Phone: 4-7536, 4-7537

San Antonio, Texas
2012 Alamo Natl. Bldg.
Charles I. MacKenzie
Phone: GArfield 3161

Memphis, Tennessee
713 Columbian Mutual Tower Bldg.
Robert W. Downs
Phone: 5-8721

Fort Worth, Texas
3821 Carolyn
John M. Turbitt
Phone: FOrtune 4369
FOrtune 5326

Corpus Christi, Texas
Rrom 301-02 Wilson Bldg.
Roy D. Baggley
Phone: 4-0366

Jackson, Mississippi
781 Raymond Road
George E. Akerberg
Phone: 5-2711

Omaha, Nebraska
3515 No. 67th Avenue
C. M. Cooley
Phone: WAlnut 1112

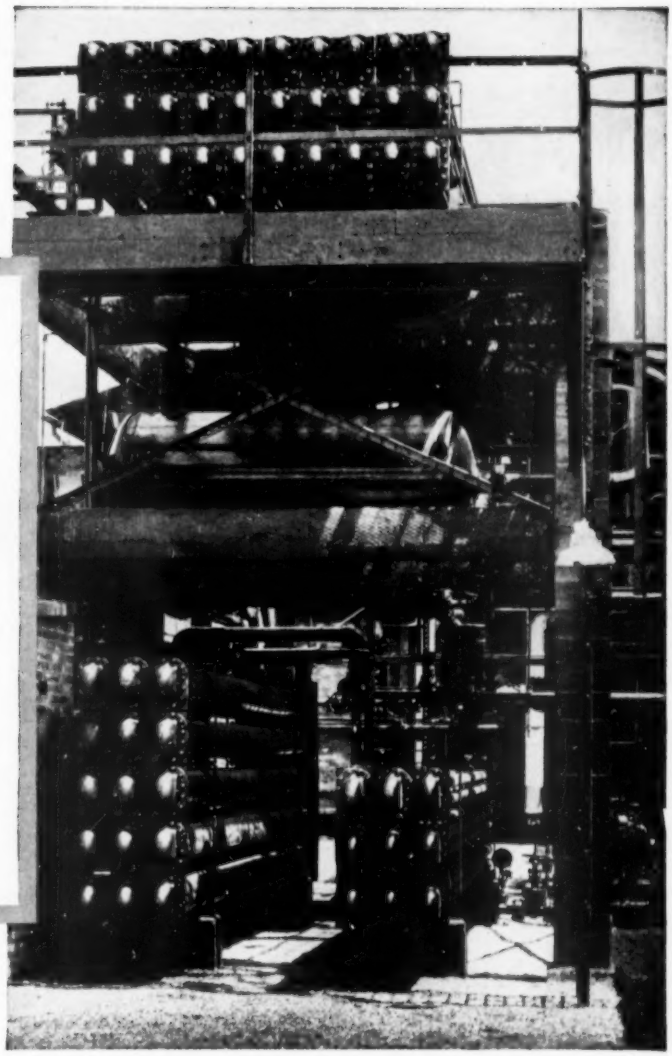
Bettendorf, Iowa
P. O. Box 181
Harry L. Newton

Des Moines, Iowa
2600 Woodland
W. P. Crowley, Jr.
Phone: 4-9923

GENERAL OFFICES: ST. LOUIS 15, MISSOURI

Heat Exchangers

you can take "off the shelf"



Have you ever thought how convenient it would be to be able to "stock" heat exchangers . . . just as you do with valves, fittings and bolts . . . so as to have them ready as quickly as you need them for heat transfer services?

You can do it with the G-R Twin G-Fin Section . . . the multi-purpose heat exchanger. These units can be set up in stacks just like a sectional book-case. They can be grouped in parallel or series for complete flexibility of capacity and temperature range. You can use them for practically any condensing, cooling, heating or heat exchange service. They are easily and quickly transported and piped up.

When you need a new heat exchanger, just write, phone or wire us to ask the Twin G-Fin Section set-up that will do the job. If the service conditions of an existing Twin G-Fin Section installation are changed, it's a simple matter to add or remove one or more sections. And if an existing installation is no longer needed because of process changes, the units can be disconnected and returned to the storeroom for "stock", to be held until the next call for heat exchangers.

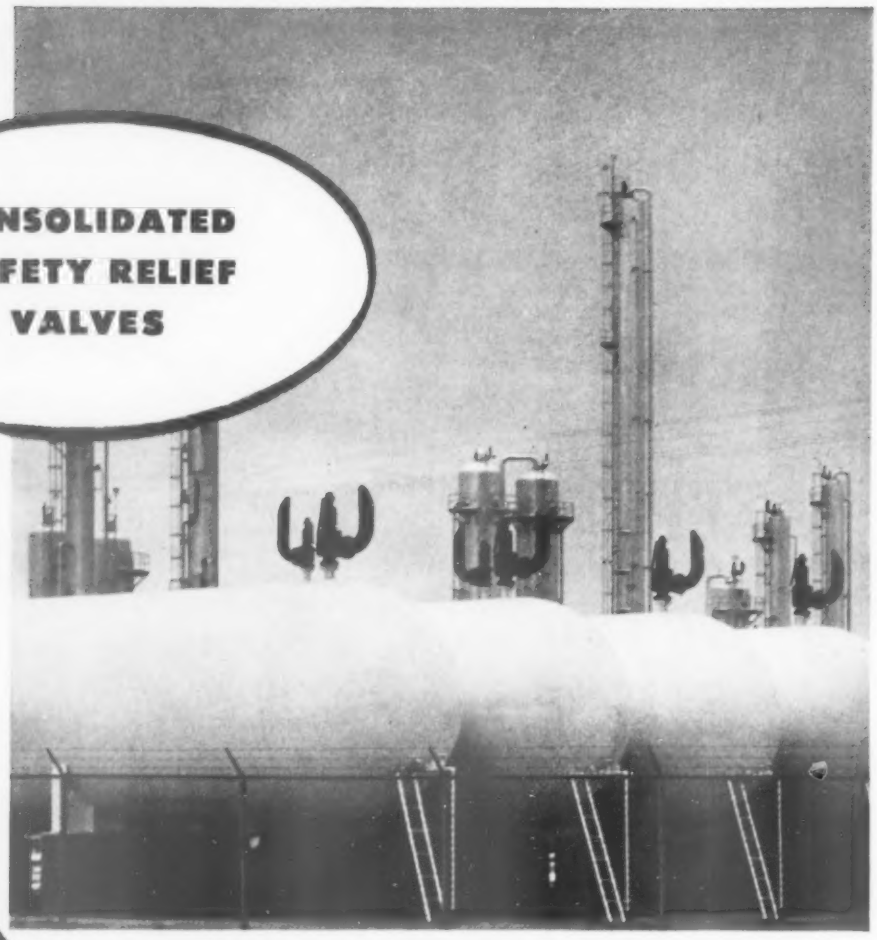
Many plants are already doing this. These plants need not wait for specially designed and manufactured heat exchangers for most of their services, nor do they have to pay the cost of "tailor made" units.

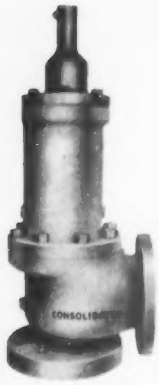
Just think of the advantages for your own plant . . . and write us for full information.

THE GRISCOM-RUSSELL CO., MASSILLON, OHIO

G-R HEAT TRANSFER APPARATUS **Twin G-Fin Section**

CONSOLIDATED SAFETY RELIEF VALVES





OUTSTANDING FOR SAFE SERVICE

ABSOLUTE PROTECTION against overpressures is the one and only function of Consolidated Safety Relief Valves — and they give it. Proof of their unbeatable performance is evident in the many unfired pressure vessels — gas, vapor and liquid storage tanks, pipelines, pumps — safeguarded by these valves throughout the processing industries.

You want complete protection for your personnel, property and equipment. Consolidated Safety Relief Valves provide it. They don't leak under discharge piping stresses — outside bevel seat and floating guide construction permit the disc to seat on a radial seating surface. *Dependable tightness* is assured in all positions within the deflection range. You can be sure of continuously reliable performance at the rated capacity, even in the most severe service.

Invest in Consolidated Safety Relief Valves and you also get the fundamental advantage of *simple design* — high quality valves that serve better and longer because they have 25% fewer parts than ordinary safety valves.

Your local Consolidated Safety Relief Valve Industrial Distributor will explain how much this can mean to you in economical maintenance and simplified standardization. Phone or write him today. He is your best source for quick information and service.

CONSOLIDATED SAFETY RELIEF VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** TULSA, OKLAHOMA

MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

Make it the Biggest Bonus ever— Give it in U. S. Savings Bonds

If your company is one of the more than 45,000 companies that have the Payroll Savings Plan you *know* what your employees think of Savings Bonds—they spell it out for you every month in their Savings Bond allotments.

If you don't have the Payroll Savings Plan, and are wondering whether your people would like to receive their bonus in Bonds, here are a few significant facts:

—every month, *before they get their pay checks or envelopes*—8,000,000 men and women enrolled in the Payroll Savings Plan invest $160,000,000 in U. S. Savings Bonds.

—the ranks of Payroll Savers are growing: On June 30th sales of $25 and $50 Savings Bonds, the sizes purchased chiefly by Payroll Savers, were 6% and 9% higher than in the corresponding period of 1952.

—Payroll Savers hold their Bonds: 75% of the $7,400,000,000 Series E Bonds which had matured up to June 30, 1953, were being retained by their owners beyond maturity under the automatic extension program.

—on June 30, 1953, the *cash value* of Series E and H Bonds—the kind sold only to individuals—totaled $36,043,000,000, a new high.

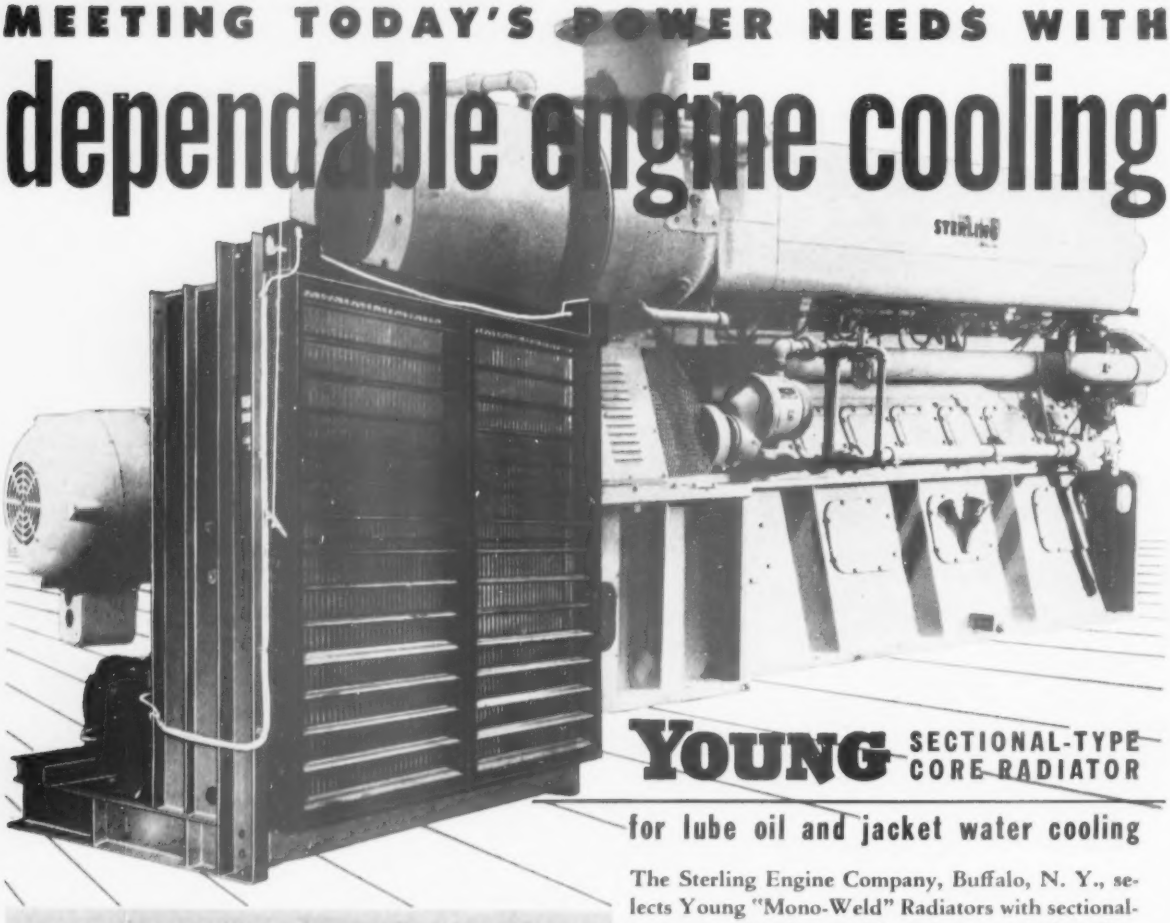
It costs no more to give your Christmas Bonus in Savings Bonds. To the Payroll Saver, and to the man who buys his Bonds at a bank (because his company does not provide the Payroll Savings Plan) a One Hundred Dollar Savings Bond looks bigger and better than a check for $75. *Make this a merrier Christmas for every employee. Give the gift that keeps on giving.*

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

THE OIL AND GAS JOURNAL
TULSA 1, OKLAHOMA

MEETING TODAY'S POWER NEEDS WITH

dependable engine cooling



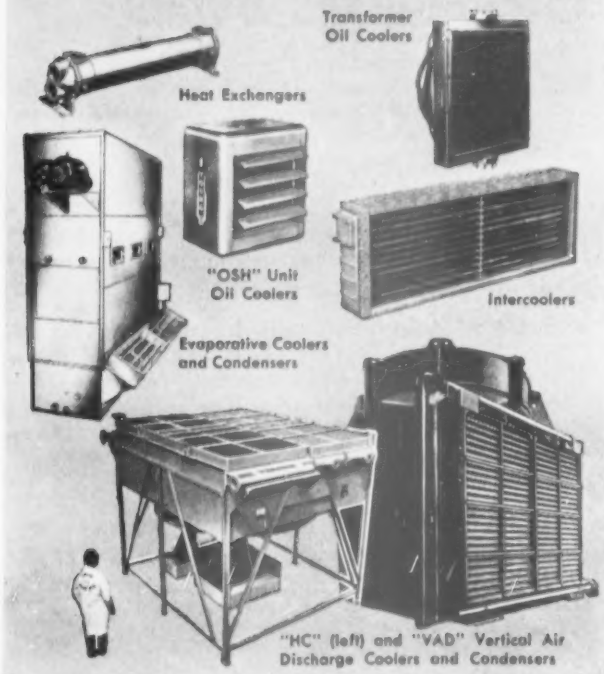
YOUNG SECTIONAL-TYPE CORE RADIATOR

for lube oil and jacket water cooling

The Sterling Engine Company, Buffalo, N. Y., selects Young "Mono-Weld" Radiators with sectional-type cores for dependable and economical cooling of lube oil and jacket water for a number of Diesel-generator units built for the Corps of Engineers, U. S. Army. These Young Radiators dissipate 2,250,000 Btu's per hr. for each of the 500-kw semi-portable Diesel generator sets.

As illustrated, many Young Heat Transfer products are serving in stationary, portable and stand-by power plants, in oil-field pipeline compressor and booster stations, etc. One-piece or sectional-type core Radiators are available in various sizes, dissipating from 70,000 to 3,250,000 Btu's per hr. For details, see your Young Distributor or write direct.

OTHER YOUNG ENGINEERED PRODUCTS FOR POWER GENERATING PLANTS


Transformer Oil Coolers
Heat Exchangers
"OSH" Unit Oil Coolers
Intercoolers
Evaporative Coolers and Condensers
"HC" (left) and "VAD" Vertical Air Discharge Coolers and Condensers

YOUNG

Heat Transfer Products for Automotive and Industrial Applications.

Young Quality — T. M. Reg. U.S. Pat. Off.

Heating, Cooling, Air Conditioning Products for Home and Industry.

YOUNG RADIATOR COMPANY

Dept. 203-L2 • RACINE, WISCONSIN

Factories at Racine, Wisconsin and Mattoon, Illinois

OIL FIELD DISTRIBUTORS

J. R. MEEK COMPANY, 1342 S. Boston St., Rm. 109, Tulsa.
FLOURNOY & EVERETT, INC., 5043 Santa Fe Ave., Los Angeles.
HAROLD J. YOUNG, 206 Montgomery Bldg., Muskegon.
JONES & LAUGHLIN STEEL CORP., Supply Div., 106 Main St., Bradford, Penn.; Union Commerce Bldg., Cleveland; 401 Liberty St., Gateway Center, Pittsburgh; Clarksburg, West Virginia.

Other Representatives in Principal Cities

Remember the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.

Your choice for strong, leakproof piping!

This TUBE-TURN Concentric Reducer is designed with the smoothest reductions and the strongest knuckle contours consistent with adequate tangent lengths and the end-to-end dimensions established for this type fitting by the American Standard. TUBE-TURN Reducers are superior to the pipe in bursting strength and their fatigue life equals that of the butt weld used to join them to the pipe.

For piping installations that are maintenance-free and have extra long life, specify TUBE-TURN Welding Fittings and Flanges. Your nearby TUBE TURNS' Distributor is at your service with industry's most complete line.

The Leading Manufacturer of Welding Fittings and Flanges

TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Chicago • Denver • Los Angeles • San Francisco
Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas

Subsidiaries: TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO • PENNSYLVANIA FORGE CORPORATION, PHILADELPHIA, PA.

THE BIGGEST INCH

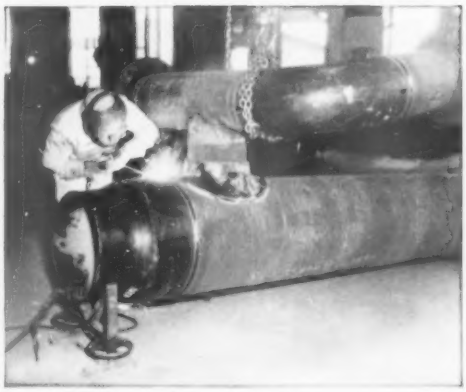
Ready for the "Biggest Inch!"

This 42" TUBE-TURN Welding Elbow is the largest welding fitting ever forged in the U. S. It is part of a production run of welding elbows for a high priority defense industry. TUBE TURNS, INC. has the engineering and manufacturing ability *now* —for the larger diameter pipelines of the future.

How TUBE-TURN Welding Fittings improve pipeline construction

More and more, TUBE-TURN Welding Fittings are being specified for directional changes in the field because of the superior strength and economy they offer compared to old-time bending methods. Mitre turns result in excessive frictional resistance and stresses, hasten corrosion, and are relatively costly. Wrinkle bends take considerable time to fabricate, and weaken the pipe. Cold bends produce a thinning on the outside radius and resultant loss of strength.

TUBE-TURN Welding Elbows are forged by the only process that produces wall thickness as uniform as the original seamless pipe . . . guaranteeing full strength throughout. You can cut them readily in the field, or obtain them factory cut to odd angles when necessary. For *safety, speed* specify TUBE TURNS.



Fabrication of piping assemblies is fast when welders can count on dimensional accuracy of TUBE-TURN Welding Fittings. True circularity and uniform wall thickness assure perfect line-up and fit. Problems of supply are also simplified since all the fittings can be obtained from a single reliable source. TUBE TURNS, INC. offers the world's broadest line of welding fittings and flanges, covering over 4000 different items.

Want Materials Data?

Tube Turns, Inc. has prepared a booklet listing properties and specifications of pipe and fitting materials—carbon steels and wrought low-alloy steels; nickel and nickel alloys, etc. For a free copy just send this coupon.

TUBE TURNS, INC., Dept. J-12
224 East Broadway, Louisville 1, Kentucky

Please send me free copy of "Pipe and Fitting Materials."

Your name .....

Address .....

City ..... *State* .....

Position .....

Company .....

DISTRICT OFFICES

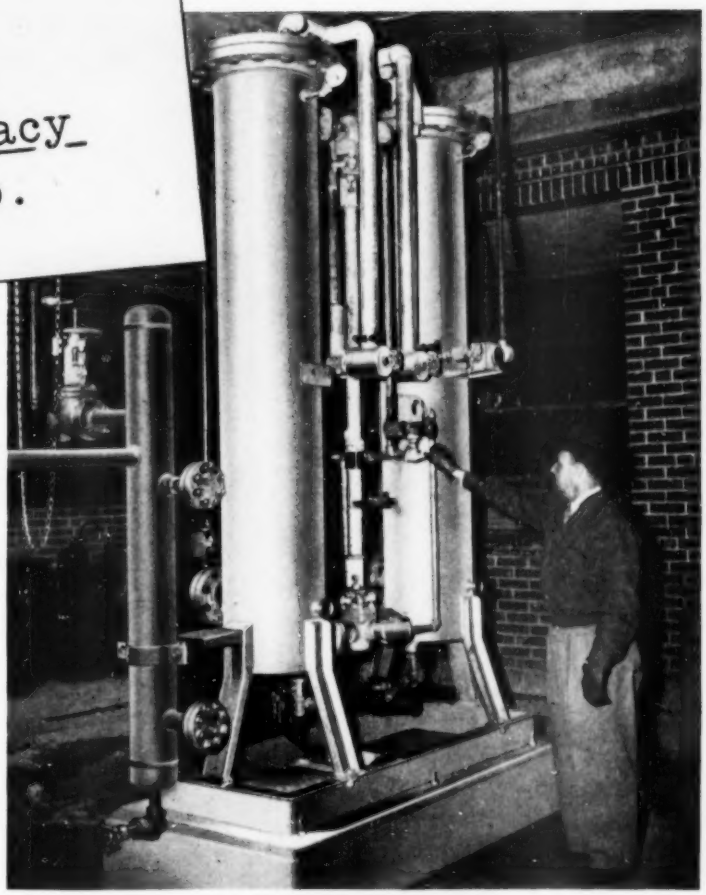
New York	Midland
Philadelphia	Tulsa
Pittsburgh	San Francisco
Cleveland	Los Angeles
Chicago	Seattle
Houston	Atlanta
Dallas	Denver

"tt" and "TUBE-TURN" Reg. U. S. Pat. Off.

TUBE TURNS, INC.
LOUISVILLE 1, KENTUCKY

Case No. 64

Kemp Dryer Assures Accuracy For Sun Oil Co.



How SUNOCO® guarantees dependable instrument readings 24 hours a day

WHEN the Sunoco Plant at Marcus Hook, Pa., introduced a new process at the beginning of the year, many new instruments were installed. To dry the compressed air operating these instruments and assure accurate readings, Sunoco installed a Kemp Model 300 S Dryer

Kemp Dryer Entirely Satisfactory

According to Harold Powers, Instrument Supervisor at Sunoco, the Kemp Dryer has been entirely satisfactory in performance. Operating continuously day and night since installation, it has performed according to specifications, has never been saturated, and has required very little attention.

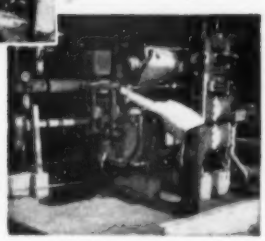
Kemp Dryers for Every Purpose

Kemp offers a variety of dryer models to meet all problems. Designed to dry air to sub-zero dew points at low cost, they are constructed of quality materials and embody the engineering knowledge gained from Kemp's many years of experience. They are available with manual, semi-automatic, or fully automatic tower reactivation. In addition, Kemp will prescribe the proper desiccant for each specific drying job. If you have a problem involving the removal of water from air, gases, or liquids, contact Kemp engineers now.

KEMP INERT GAS GENERATORS, too, serve Sunoco well

Sunoco reports that its two Kemp Inert Gas Generators have given highly satisfactory service. They are easy to start, and then operate automatically, requiring little attention. Both deliver high volume of gas of the proper analysis regardless of demand.

Kemp Inert Gas Generator Model C-5 MIHE. Delivers N_2 and CO_2 used to blanket top of wax tank.



Kemp Inert Gas Generator Model B MIHE. Produces N_2 and CO_2 for blanketing and for bubbler systems. Located in the open.

For more complete facts and technical information, write for Bulletin D-27 to:
THE C. M. KEMP MFG. CO., 405 East Oliver Street, Baltimore 2, Md.

KEMP OF BALTIMORE

DYNAMIC DRYERS

CARBURETORS • BURNERS • FIRE CHECKS
METAL MELTING UNITS • INERT GAS GENERATORS
SINGEING EQUIPMENT

Do your check valves last less than 30 days?

If they do, then you will be interested in Kennametal Balls and Seats. You'll find that they can give 20 times longer service than alloy steel*, resist shock, pitting, sand cutting, and corrosion far better. (Often they last for a year or more, even in severe sand cut fluid.) Round tripping costs can be greatly reduced, and production increased due to more continuous pumping.

Kennametal sintered-carbide Balls and Seats retain bottom hole valving efficiency due to their extreme "diamond-like" hardness. Their wear and corrosive resistance provide unexcelled performance in sand, sour crude, hydrogen sulphides, water and gas cut fluids.

Consider that a single round tripping of string costs many times more than the highest-priced or largest Kennametal Ball and Seat. For this reason, many fields are standardizing on Kennametal. Also, it is for this reason that they are incorporated in most leading pumps as standard equipment. A complete line of Kennametal API sintered carbide Balls and Seats (in both plain and rib styles) is available from your supplier.

**As proved by comparative performance in both the Mid-Continent and West Coast Fields.*

KENNAMETAL®

PUTS AN END TO DOWN-THE-HOLE VALVE CHECK TROUBLE

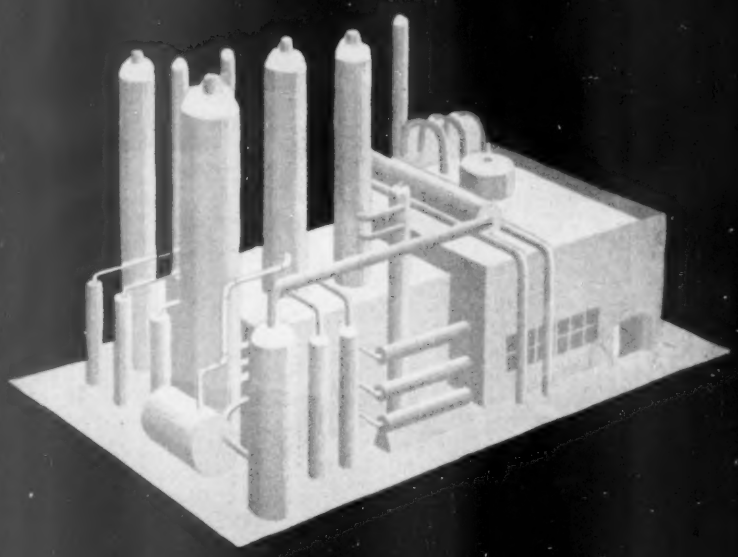
Quality Sintered Carbide API Balls and Seats

Manufactured by

Kennametal Inc., Latrobe, Pa.

SOLD BY YOUR REGULAR SUPPLIER

AUTOMATION...



will prevent processing headaches

The increasing complexity of petrochemical processing will call for automation beyond today's approach to measurement and control.

Continuous analyzers, for example, point to a significant trend toward "thinking machines," which may ultimately control a whole process on the basis of desired qualities in the finished product. Honeywell has helped to implement this and other new concepts, and will continue to work toward the realization of practical automation.

While the capabilities of instrumentation are being extended, so too is its dependability. For the more automatic a plant gets, the greater becomes the responsibility on the automatic equipment which keeps processes coordinated.

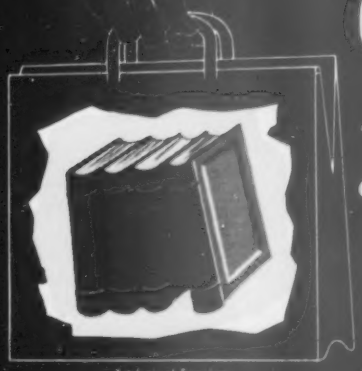
Long identified with instrumentation's parade of progress, Honeywell's Industrial Division serves the petrochemical industry from lab to pilot plant to "on-stream" operation. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● **REFERENCE DATA:** Write for your copy of "How Automatic Can We Get?" a challenging discussion of the future of instrumentation.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

CYANAMID SERVICE

. . . integrated to meet your chemical requirements—now and in the future



Technical Service

AEROPAN Drilling Mud Conditioner

Gelling Agents

AEROLUBE Lubricating Oil Additives

The extent of Cyanamid's service to the petroleum industry is well illustrated by the wide range of Cyanamid Chemicals—from drilling mud conditioners to lube oil additives.

Cyanamid Service, however, is more than chemicals. It is constant research . . . extensive manufacturing facilities . . . and a skilled staff of technical field specialists—all carefully integrated to meet chemical requirements in every phase of production and refining.

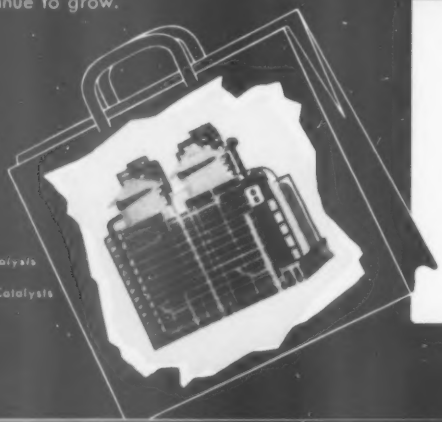
Cyanamid Service, too, is a continuing program of plant expansion designed to keep pace with the petroleum industry's rapid growth. Results of this program have been milestones in petroleum progress. In the field of synthetic catalysts, for example:

1942 . . . Cyanamid starts production of synthetic fluid cracking catalysts at Fort Worth, Texas, to help refiners meet demand for high octane fuel.

1946 . . . Cyanamid becomes the first company to manufacture microspheroidal cracking catalysts on a commercial scale.

1951 . . . Cyanamid builds new MS plant at Michigan City, Indiana, as refining demands continue to grow.

Specialty Catalysts



AEROFORM MS Fluid Hydroforming Catalysts

AEROCAT MS Synthetic Fluid Cracking Catalysts

AMERICAN Cyanamid COMPANY

REFINERY CHEMICALS DEPARTMENT, DIV. OC-11
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

ACCURATE FORMATION DATA

ONLY FEW CENTS PER FOOT!

HALLIBURTON'S *FM* ELECTRONIC LOGGING

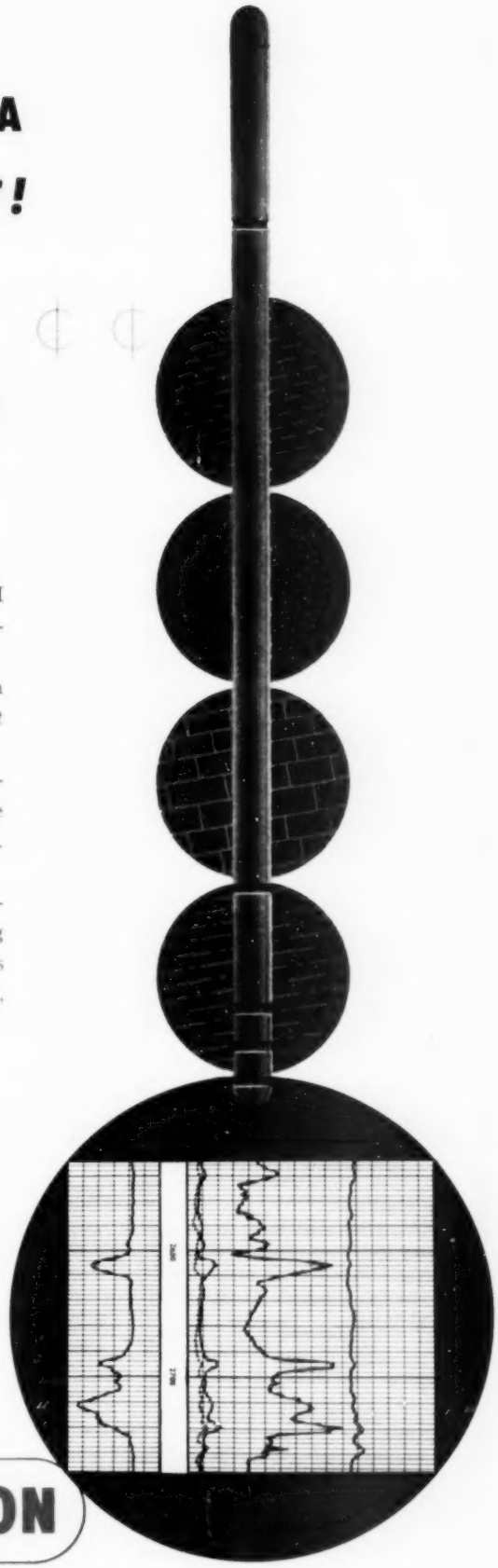
Downhole information acquired with this outstanding FM Electronic Logging system remains valuable during the lifetime of the well.

This accurate data will guide each move you make in developing and improving the production of your well. *Yet it costs only a few cents per foot.*

Halliburton's Frequency Modulation log provides maximum information in minimum time. One trip records all the electronic curves that ordinarily require three or four trips. And you can select your choice of curves.

Electronic Logging also aids modern improved interpretation and offers so many more benefits than ordinary logging systems: zero basing, single conductor cable, values unaffected by cable conditions, identical reference points, and simple, automatic operation.

More exact formation data can be yours for only a few cents a foot when you use Halliburton's FM Electronic Logging. Call your nearby representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.



YEARS AHEAD IN ELECTRONIC LOGGING!

HALLIBURTON

"Th' seasons pass–but McKissick is still The Champ"

McKISSICK
Super Champion
SNATCH BLOCK
Always the Best

- ★ **Patented opening feature permits easy insertion of line while block is suspended.**
- ★ **Drop forged heat treated steel hooks, shackles, yokes and well rounded shells — bead encircled sheaves.**
- ★ **Impossible for ropes to jam.**

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

They Say—

Cartel Charge Doesn't Add Up

"A group of American oil companies, which also operate abroad, is being sued by the Government under the antitrust laws for alleged conspiracy to restrain and monopolize commerce. The complex legal points involved are for the lawyers to argue and the courts to decide. But there is one extremely important phase of the matter which is perfectly understandable to the laymen.

"True monopolies almost invariably have two characteristics. First they are static—a handful of large concerns control production and distribution. Second, they use their monopoly power to force up prices.

"The American oil companies . . . have none of the static quality of monopoly. Production of oil, both here and abroad, has increased enormously.

"In the matter of price, competition and the research and progress forced on individual oil companies by competitors, has produced great benefits for consumers."

From an editorial in the Oil City (Pa.) Derrick.

Oil Products Always Available

"Few products have ever been so available to a consuming public as petroleum products in America. The vast and complex distribution system of pipe lines, tankers, tank cars, and truck transports has but one objective in mind—to deliver the product to the ultimate consumer and at a reasonable profit.

"The flow of products from the oil fields and refineries to the consumer must be maintained at a steady rate. Yet it is a rare occasion when even one customer goes without the petroleum products he desires. Can you always be sure of obtaining the particular food or clothing items you want, no matter where you travel, 24 hours a day, 7 days a week?"

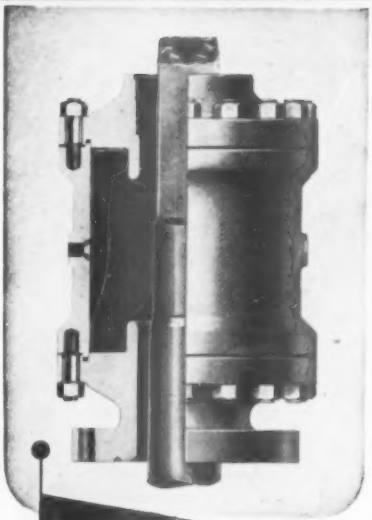
L. F. McCollum, president of Continental Oil Co., addressing the Kansas City Oil Men's Club.

Science Moves Into New Phase

"We have now opened up a whole new stage for our national development, a stage on which the elements of the land and the people are augmented by a third dimension—the dimension of science.

" . . . we have an excellent example

STANDARD
OF THE
PETROLEUM INDUSTRY
Since 1905



Regan *type* **K**
BLOWOUT PREVENTER

Gives you complete blowout control at all times. Instantaneous closure can be made by remote control by applying pressure behind rubber packer. Inner and outer slot arrangement in moulded rubber packer prevents closure distortion. Normally open to full size of casing—will close around any size or shape of pipe, kelly or tool. No parts to change—no metal-to-metal parts to become inoperable. Thoroughly proven in actual use in all major domestic and foreign oil fields.

Send for detailed information.

51

Regan
Forge & Engineering Co.
SAN PEDRO, CALIF.
FORT WORTH, TEXAS
Exclusive Mid-Continent and Export Distributor:
MID-CONTINENT SUPPLY CO.
General Offices: Fort Worth, Texas
Quality – Wrought on the Forge of Experience

most widely imitated Rotary Hose in the oil fields

Thermoid

POWERFLEX

Rotary Hose & Discharge Units

premium quality at regular price!

- Oil and abrasion resistant synthetic tube.
- Impregnated multi-ply woven fabric body.
- High tensile steel cable reinforcement.
- Patented full-flow couplings securely anchored to each individual cable—positively cannot blow off.
- Tough, extra-heavy, weather and abrasion resistant cover.
- Coupling guaranteed leak-proof for hose life.

Each length pre-tested to 5000 psi before shipment.

Exceeds all A.P.I. requirements for Grade C Hose.

Available in all standard sizes and lengths. Get Powerflex from your supply house or the nearest Thermoid warehouse.

Thermoid Industrial Rubber Products — Quality — Service

Mid-continent Office and Warehouse: Houston, Texas
California Office and Warehouse: Los Angeles, California

SEE OUR CATALOG IN THE COMPOSITE CATALOG

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

Thermoid

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

of this dynamic force at work and an illustration of how technology multiplies our national resources. When oil was first discovered . . . it was first used in its crudest forms—as grease for wagon wheels and the so-called coal oil for kerosine lamps. In those days, the chemical fraction of the oil from which we now get paraxylene was burned off, or escaped as a useless gas or was otherwise wasted in its entirety.

"Modern technology led us to the means to create a useful product out of this material which was once thrown away, and I know of no better example than paraxylene to bring home to us the full force of technology's impact upon our economic structure."

Henry B. du Pont, vice president of E. I. du Pont de Nemours & Co., Inc., addressing the Kinston, N. C., Chamber of Commerce.

Much of Rockies Still Unexplored

"The discovery of oil in the Williston basin in North Dakota did more to bring the oil of the Rockies to the attention of the world at large than almost any other development in the history of the region.

"The Williston basin broke the last vestiges of the splendid isolation which has held the region since its early exploration. It revealed . . . that steady work in the development of the region's oil resources had demonstrated the presence of oil in quantity sufficient to justify a major exploratory effort.

"Explorationwise the region has hardly been scratched, despite the amount of work done in the past 70 years. Hardly more than one wildcat well has been drilled for each 75 sq. miles of potentially productive area."

Tom Dougherty of Petroleum Information, Denver, addressing the annual meeting of American Association of Oil Well Drilling Contractors, Denver.

Arkansas Still Wants Handout

"Arkansas, several hundred miles from the coast, has waded out into the salt water with a suit challenging the recently enacted tidelands law. It appears that the land-lubberly razor-back state ventured out beyond its depth and not only got its feet wet, but got all wet.

"Arkansas, a Democratic state through New Deal thick and Fair Deal thin, has long been receptive to manna from the handout heaven on the Potomac. But this time the ravens are more than likely to make a dry run."

From an editorial in the Houston Post.

Why Imports Shouldn't Be Cut

"General Thompson has stated that the cushion above current production set by the PAD does not exceed 600,000 bbl. a day. Now, the imports of crude have been running about 650,000 bbl. a day. Take away imports, we would have no such cushion for our own security. In fact, we would be on the dangerous borderline between supply and demand.

"And remember . . . that each year our national daily consumption has increased by an additional one-half million barrels. Were present oil imports suddenly cut off, while that normal consumption increase continued, we could well face another period of rationing and stringent controls."

J. S. Leach, chairman of the board of The Texas Co., addressing the Texas Mid-Continent Oil and Gas Association, Houston.

Why Imports Should Be Cut

"It seems crystal clear to me that we are allowing domestic production to be supplanted by foreign oil to a degree that threatens our domestic producing industry.

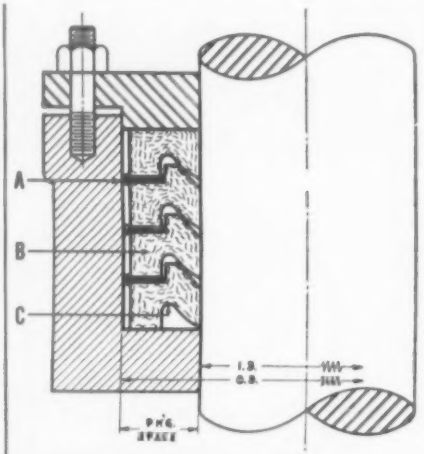
. . . Year-end increases in imports, it is hoped, will be tapered off, because

R/M "Vee-Square"* IS A REVOLUTIONARY NEW TYPE OF PACKING

Ordinary V-ring packings require sensitive, finger-tight adjustment, something it is hard to get in mud pumps and heavy oil-field equipment. R/M "Vee-Square" provides a perfect packing seal, even when glands are taken up tight. Try it on your mud pumps and see for yourself how rod costs are reduced. The R/M "Vee-Square" combines the positive nonyielding properties of solid packing with the automatic sealing of V-ring design. It has a cushion to compensate for any overtightening.

Sizes for all types and makes of mud pumps. Free bulletin sent on request.

**Patent Pending*



3 principles of R/M "Vee-Square" design

A. Soft rubber ring squeezes against rough wall of stuffing box and insures proper sealing pressure.

B. Solid portion is square. Absorbs gland pressure. Keeps packing from rolling and riding rod.

C. V-design provides automatic sealing.

WHAT OTHER PACKING HAS THESE 7 ADVANTAGES?

1. Rods last longer because of minimum friction
2. Self-sealing—does not require sensitive gland adjustment
3. Easily installed
4. Rings easily assembled without special adapters, all rings identical
5. Prevents "blow-by"
6. Keeps packing from rolling
7. Can't ride with rod

R/M

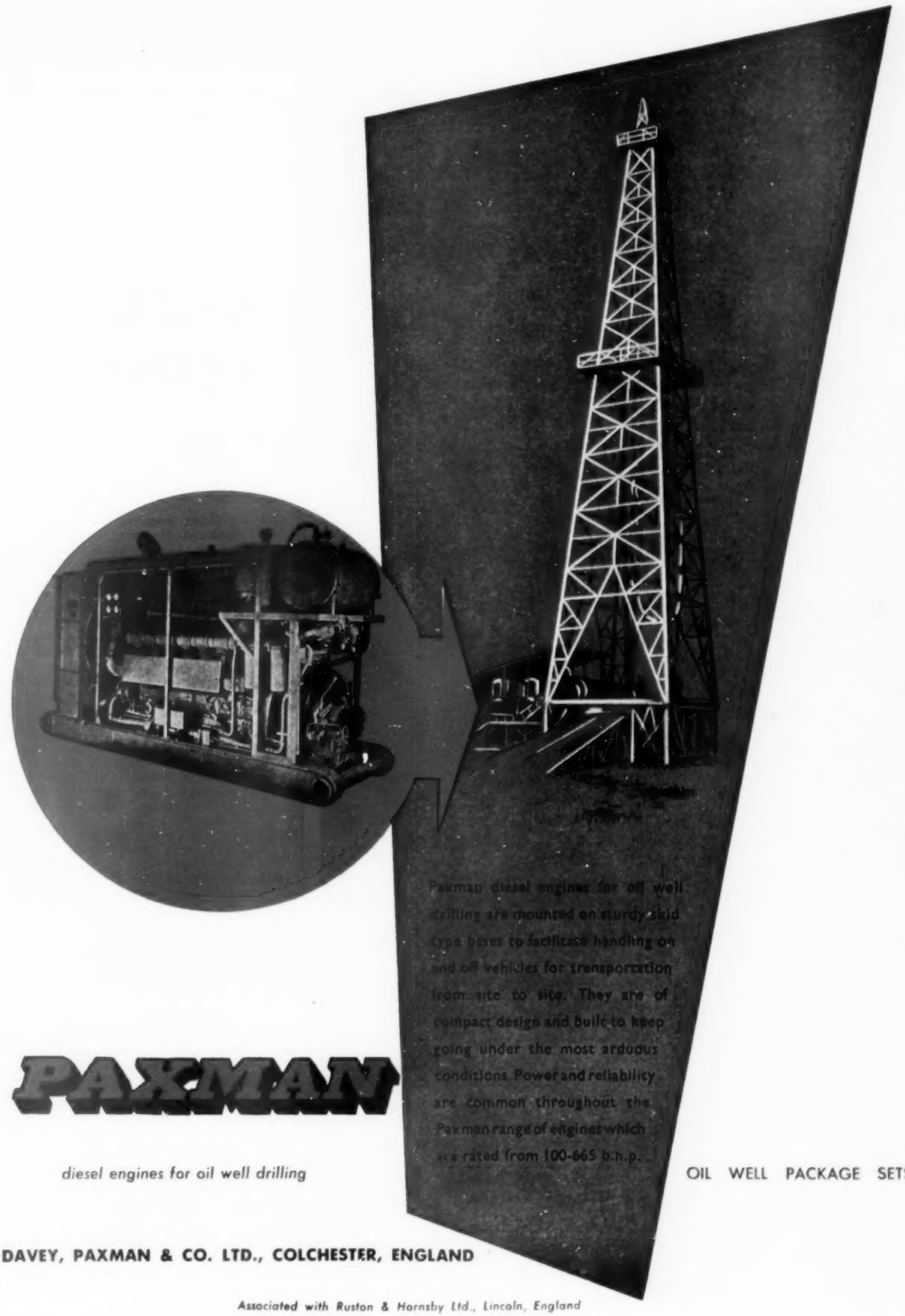
PACKINGS

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Manufacturers of Packings • Teflon Products • Asbestos Textiles • Industrial Rubber Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Sintered Metal Products • Bowling Balls



Paxman diesel engines for oil well drilling are mounted on sturdy skid type bases to facilitate handling on and off vehicles for transportation from site to site. They are of compact design and built to keep going under the most arduous conditions. Power and reliability are common throughout the Paxman range of engines which are rated from 100-665 b.h.p.

PAXMAN

diesel engines for oil well drilling

OIL WELL PACKAGE SETS

DAVEY, PAXMAN & CO. LTD., COLCHESTER, ENGLAND

Associated with Ruston & Hornsby Ltd., Lincoln, England

When you think of
PUMPING UNITS
Think of
ALTEN
including IDECO types

ALL API SIZES

BOTH AT YOUR LOCAL SUPPLY STORE

BOTH MANUFACTURED BY

ALTEN
Foundry & Machine Works, Inc.
LANCASTER, OHIO

SALES OFFICES
Lancaster, Ohio
Olney, Illinois
Hutchinson, Kansas
Duncan, Okla.
Tulsa, Okla.
Wichita Falls, Texas
Houston, Texas
Midland, Texas
Casper, Wyoming
Edmonton, Alberta, Canada

EXPORT OFFICE
New York City

WAREHOUSES
Lancaster, Ohio
Wichita Falls, Texas
Houston, Texas
Odessa, Texas
Casper, Wyoming
Edmonton, Alberta, Canada

we, the producing states, have been forced to take slashes in production because of the great increase in inventories in products and in crude.

"Certainly some sound business statesmanship is indicated as being necessary. It is now high time for action on the part of the importing companies instead of mere words."

Ernest O. Thompson, chairman of the Texas Railroad Commission, speaking in San Francisco.

CALENDAR OF EVENTS

NOVEMBER

Nov. 29-Dec. 2 American Society of Mechanical Engineers, Statler Hotel, New York City.

DECEMBER

1-4 Corrosion conference, University of Oklahoma, Norman.

4-5 Interstate Oil Compact Commission, winter meeting, Skirvin Hotel, Oklahoma City, Okla.

5 Twenty-fourth Exposition of Chemical Industries, Commercial Museum and Convention Hall, Philadelphia.

10-12 American Chemical Society, regional meeting, southeast and southwest sections, Jung Hotel, New Orleans.

13-16 American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

1954

JANUARY

11-15 Society of Automotive Engineers, annual meeting and engineering display, Sheraton-Cadillac and Statler Hotels, Detroit.

12-14 National Constructors Association, annual meeting, Hotel Commodore, New York City.

18-22 American Institute of Electrical Engineers, winter general meeting, Hotel Statler and Hotel McAlpin.

25-28 Plant Maintenance & Engineering Conference, Hotel Conrad Hilton, Chicago.

27-29 Ninth annual symposium, "Instrumentation for the Process Industries," Texas A. & M. College, College Station, Tex.

25-28 Plant Maintenance & Engineering Show, International Amphitheatre, Chicago.

FEBRUARY

11-12 Western Petroleum Refiners Association, regional meeting, Hotel Beaumont, Beaumont, Tex.

26 Natural Gasoline Association of America, Permian Basin regional meeting, Lincoln Hotel, Odessa, Tex.

MARCH

1-5 American Society for Testing Materials, spring meeting, Shoreham Hotel, Washington, D. C.

3-5 American Petroleum Institute, Division of Production, Southwestern district, Rice Hotel, Houston.

Hold High Pressures

WITH GUIBERSON HIGH PRESSURE STRIPPERS

TYPE "JUS" HIGH PRESSURE STRIPPER
Incorporates slip and bowl with packing gland.

Both types made for 2", 2½" or 3" tubing.
Also may be used for 1", 1¼" and 1½" macaroni strings.
Can be furnished with 6" series 400, 600 or 900 or 8" series 400 bottom flange.

TYPE "JU" HIGH PRESSURE STRIPPER
Flat top of packing gland accommodates Guiberson Type "B" tubing spider.

For running or pulling tubing under pressure, for clean-out work using reverse circulation—for *any* heavy-duty job where efficiency and success depend on a non-rotating high pressure stripper—Guiberson has the answer at low cost.

- 2 Models—"JU" without slips
  —"JUS" with slips
- Tubing collars pass without leakage!
- 3-inch adjustment on packing rubber!
- Rubbers can be changed without taking stripper from well head!
- Slips hold tubing fast but won't stick in bowl!

THE
GUIBERSON
CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

Better Be Safe Than Sorry!

354

Lane-Wells packers to meet your requirements

"I knew they'd always have the answer for my jobs—but I was surprised when I got to checking the Lane-Wells catalog.

"Valve packers and valveless packers; hookwall packers and sit-down packers; packers for cased hole and packers for open hole; packers for testing and for production; casing-to-casing and tubing-to-casing packers; even an 'upside-down' packer for use where pressures below the packer are very high.

"Matter of fact, I got curious, and counted 'em. And, do you know, I found that Lane-Wells has 354 different sizes and types of packers! No wonder they can handle packer jobs quickly and efficiently."

Tomorrow's Tools—Today!®

LANE-WELLS COMPANY

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

AP-608

4- 5 American Gas Association, transmission and storage conference, Jung Hotel, New Orleans.
8-10 American Institute of Chemical Engineers, Statler Hotel, Washington.
15-19 National Association of Corrosion Engineers, annual meeting, Municipal Auditorium, Kansas City, Mo.
17-19 American Petroleum Institute, Division of Production, Mid-Continent district, Skirvin Hotel, Oklahoma City.
29-31 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

APRIL

4- 6 Texas Independent Producers and Royalty Owners Association, Rice Hotel, Houston.
5- 7 American Society of Lubrication Engineers, Netherland-Plaza Hotel, Cincinnati.
8- 9 American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Townsend Hotel, Casper, Wyo.
13-15 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.
14-16 National Petroleum Association, fifty-first semiannual meeting, Cleveland Hotel, Cleveland.
21-23 Natural Gasoline Association of America, thirty-third annual convention, Baker Hotel, Dallas.
26-28 Southern Gas Association, annual convention, Houston.

MAY

2- 4 Independent Petroleum Association of America, midyear meeting, Cosmopolitan Hotel, Denver.
3- 5 American Geophysical Union, thirty-fifth annual meeting, National Academy of Sciences, Washington, D. C.
6- 7 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Statler Hotel, Los Angeles.
10-12 American Petroleum Institute, Division of Transportation, Products Pipe Line Conference, Warwick Hotel, Philadelphia.
10-13 American Petroleum Institute, Division of Refining, midyear meeting, Rice Hotel, Houston.
17-19 American Petroleum Institute, Division of Marketing, midyear meeting, Cosmopolitan Hotel, Denver.
24-26 American Gas Association, production and chemical conference, William Penn Hotel, Pittsburgh.
27-28 Natural Gas and Petroleum Association of Canada, Prince Albert Hotel, Windsor, Ont., Canada.
31-June 5 American Petroleum Institute, Division of Production, midyear committee conference, St. Francis Hotel, San Francisco.

JUNE

6-11 Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.
13-18 American Society for Testing Materials, annual meeting and exhibits, Sherman Hotel, Chicago.
17-19 American Petroleum Institute, Division of Production, eastern district meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.
20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alta., Canada.
27
July 1 Petroleum Equipment Suppliers Association, nineteenth annual meeting, Manoir Richelieu, Murray Bay, Que., Canada.

Here's the key—

TO A "FREE" TUBING STRING

SAME O. D. AS TUBING COUPLING
LEFT-HAND SQUARE THREADS RELEASE EASILY AND POSITIVELY
OIL-RESISTANT THREAD SEAL
"FULL-BORE" SAME I. D. AS TUBING
Product No. 441

You need never worry about freeing your tubing from packers and other devices that sometimes freeze in the hole after prolonged periods of use—not if you've taken the precaution to install a Baker Safety Joint strategically in your tubing string.

BAKER SAFETY JOINT

A few turns to the right unscrews the Baker Safety Joint, freeing your tubing quickly and easily. And you just don't worry about the Baker Safety Joint ever freezing or sticking. It is especially designed to unscrew easily even after long periods of sub-surface exposure.

Precision-matched *left-hand* square threads are of the exact tolerance and taper to ensure positive breaking of the joint. The tough, oil-resistant thread seal effectively protects these threads from corrosive fluids.

YOUR SUPPLY STORE has BAKER SAFETY JOINTS in stock, or will get them for you promptly.

BAKER OIL TOOLS, INC.
HOUSTON • LOS ANGELES • NEW YORK

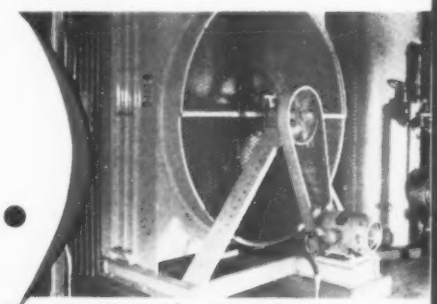
HAPPY *for*

..pumping units....

● *HAPPY TS 160-A Single Reduction Chain Driven Pumping Units with exclusive HAPPY Adjustments*

HAPPY

..coolers.....



● *HAPPY VFF-240 Jacket Water Cooler with Automatic temperature control drive*

HAPPY

..engine starters...

● *HAPPY Engine Starter on oil field pumping engine. Inset photo shows compactness of starter*

You can depend on HAPPY for a complete line of: Safety Switches, Power Transmission Equipment, Happy Rubber Belting, Happy Leather Belting, Happy Perfect-Grip V-Belts, Happy Perfect-Grip Sheaves and complete stocks of Industrial Hose.

The HAPPY *Company*

TULSA, OKLAHOMA

STORES Seminole, Okla. • Tulsa, Okla. • Pampa, Texas
Odessa, Texas • Salem, Illinois • Ellinwood, Kansas

OFFICES Dallas, Texas • Wichita Falls, Texas • Kilgore, Texas
Wichita, Kansas

THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Phone 3-6291. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

•

P. C. Lauinger, President; S. H. Rourke, Executive Vice President; Mitchell Tucker, Vice President and Advertising Manager; Hanson B. Pigman, Circulation Manager; Donald W. Wilson, Manager, Industry Census Department; J. Parker Holland, Production Manager.

EDITORIAL STAFF

Kenneth B. Barnes, **Editor**; Henry D. Ralph, **Chief Editorial Writer**; Ted A. Armstrong, **News Editor**; George H. Weber, **Refining Editor**, 500 Fifth Avenue, New York; Dahl M. Duff, **International Editor**, 500 Fifth Avenue, New York; Gerald L. Farrar, **Engineering Editor**; Paul Reed, **Pipe-Line Editor**; W. L. Nelson, **Technical Editor**; Philip C. Ingalls, **Exploration Editor**; C. O. Willson, **Consulting Editor**; John C. Reidel, **Petrochemical Editor**; R. B. Tuttle, **Equipment Editor**.

Associate Editors: Lynn M. Nichols, Neil Williams, and John C. Casper.

District Editors: TULSA: Joseph A. Kornfeld, Edwin McGhee, Robert J. Enright, Carl Hoot, John C. McCaslin, Paul F. Swain, George Van Zant, and Charles L. Burch. HOUSTON, Sterling Building; F. Lawrence Resen and William P. Sterne. LOS ANGELES, 650 South Grand Avenue; D. H. Stormont. WASHINGTON, D. C., 621 Albee Building; Bertram F. Linz.

Editorial Assistant: Martha Allbright.

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

Advertising Offices: TULSA, John D. Reilly, Mid-Continent Manager and George O. Ruppert, Representative, 211 South Cheyenne, Phone 3-6291; NEW YORK: Charles A. Wardley, Eastern Manager, and Robert N. Caird, Jr., Representative, 500 Fifth Avenue, Phone LOngacre, 4-1750; CHICAGO: E. S. Klappenbach, Midwestern Manager, and David T. Kenney, Representative, 105 West Madison Street, Phone Central 6-2537; PITTSBURGH: Alfred M. Jones, Manager, 429 Fourth Avenue, Phone Atlantic, 1-4835; HOUSTON: John M. Spears, Gulf Coast Manager, Sterling Bldg., Phone CHarter 4626; LOS ANGELES: Donald O. Hanson, Manager, 650 South Grand Avenue, Phone Vandike 0722; ENGLAND: Harry Becker, European Representative, 111 Thorley Lane, Timperley, Cheshire, Phone Ringway 4702.

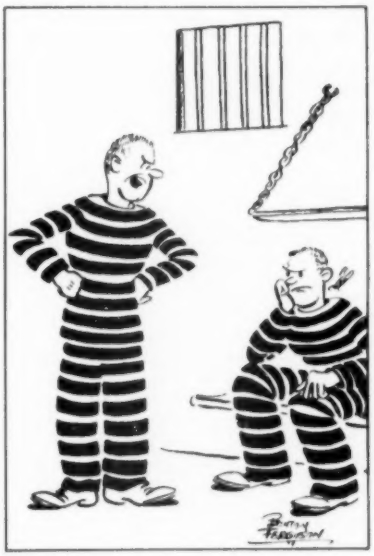
•

Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1953 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

What's the Gag?



HERE'S your chance to show your wit and cleverness: Write a gag line for this cartoon.

Somehow, somewhere between our shop and the engraver's the cutline got lost from this cartoon.

The artist, being a nimble-witted and forward-looking individual, couldn't recall what he had in mind way back when he drew it. The stolid and serious members of our staff, none of whom has ever worn a horizontally striped suit, were unable to come up with anything appropriate.

Why don't you try? We will edit out and disregard any replies which imply that either of these agitated gentlemen is the fellow who lost the original gag or the conductor of this column. Gag lines which we think have the most appeal to oil men will be printed on this page with the names of—and thanks to—the contributors.

Riveting History

THE following item appeared recently in a nationally circulated weekly news magazine.

"At Bradner, B. C., 35 miles outside of Vancouver, a construction worker pounded out a bit of history with his riveting gun one night last week. He drove home the last rivet in the Trans Mountain pipe line . . ."

We rise to ask: Who pounded out history? Was it a pipe-line riveter? Or a desk-bound, oil-ignorant rewrite man on that news magazine?

If the Trans Mountain pipe line really **was** put together with rivets, then it made a lot more history than the news magazine realized. In all the history of the oil industry, pipe lines have been joined with sleeves, couplings, flanges, collars, and various types of welds—but never with rivets.

Furthermore, if it **is** a riveted line, then our favorite oil publication should have a very red face. We said the line was welded throughout its more than 700 miles. We even printed pictures purporting to show the welding operation.

Until proved otherwise, we will assume that these rivets were a figment of some ink slinger's imagination and that the "Oil Man's Bible" can still be depended on as the authoritative source of pipe-line news.

No Raps on Wrappers

WELL, our mechanical department has just about got all the bugs out of our new wrapping machine, and all of you should now be receiving your copies of the magazine promptly, tightly wrapped, and in good condition.

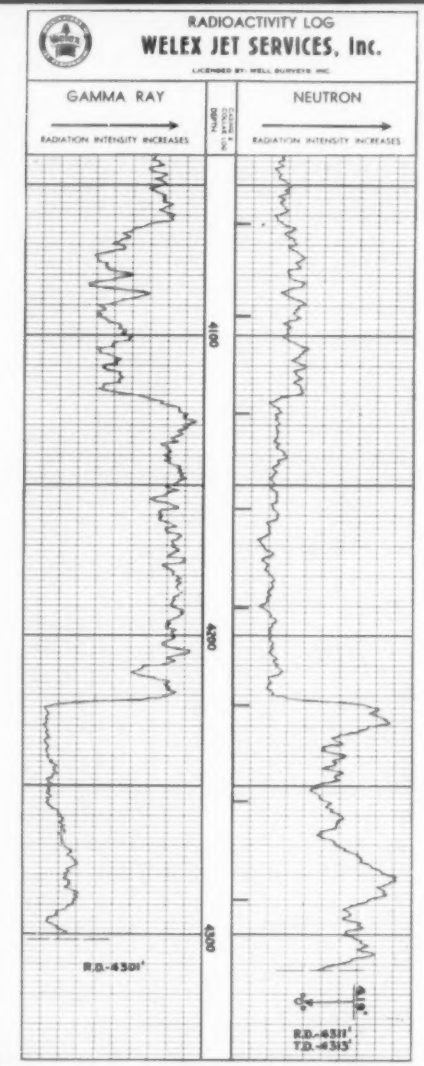
Equipment used in the publishing business is apt to be delicate and tempermental, but this new gadget contained an unusual number of gremlins. The first day it was used it took about twice as long to complete the mailing as it took when envelopes were used, whereas it was supposed to take only half as long.

But we managed to make the mail trains, and have had no complaints from subscribers that they missed their copies. In fact, some of them thoughtfully wrote in to say that their copies arrived in better condition than before.

—Henry D. Ralph.

Welex RADIOACTIVITY WELL LOGGING . . .

RESULTS YOU CAN RELY ON



A PROCESS THAT IS PROVED

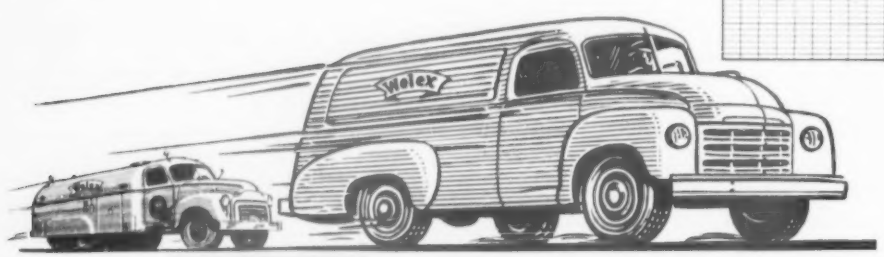
LICENSED BY WSI. Welex Jet Services logs your well by the most advanced radioactivity logging system known to the industry . . . the process perfected by Well Surveys, Inc., of Tulsa, Oklahoma, and proved by successful application throughout the world. Welex field crews, seasoned by years of leadership in jet perforating, are thoroughly trained in the application of this proved process. Welex logging gives you the Gamma Ray and Neutron curves singly or in combination, depending on the problem to be solved.

EQUIPMENT THAT IS IMPROVED

WELEX MODERN EQUIPMENT provides the high degree of precision, sensitivity, and reliability that is essential for maximum value from your radioactivity well surveys. Hoist units, depth measuring equipment, and instrument trucks are the newest and best in the business. Being new in the field of radioactivity well logging, Welex is not burdened with equipment that may be approaching the end of its useful life.

FOR THE LATEST AND BEST

SAFEGUARD YOUR DRILLING INVESTMENT by using logging and perforating processes that are proved effective. *Results* cost less, when you specify the best. Call your nearest Welex Field Station for prompt service day or night.



ORIGINATORS OF Welex JET PERFORATING

Welex JET SERVICES INC.

GENERAL OFFICES: 1400 E. Berry, Fort Worth, Texas

FIELD STATIONS: Abilene • Ardmore • Beaumont • Corpus Christi
Falfurrias • Gainesville • Great Bend • Hobbs • Houston • Odessa
Pampa • Pauls Valley • San Angelo • Shawnee
Stillwater • Victoria • Wichita Falls

Import oil? Of course, but a little less right now

LET'S have straight thinking about foreign oil. The subject is due for lengthy discussion at several official and unofficial inquiries scheduled in Washington soon. It is important to clarify the issues.

The case for foreign oil was ably presented by several speakers at the recent A.P.I. meeting in Chicago. There can be little disagreement with anything said there. What is causing all the current ruckus and misunderstanding is the failure to distinguish between long-range principles and short-range facts.

OF course foreign trade is essential. Nobody wants to stop it, or embargo foreign oil; nobody wants to undermine our defense program, or wreck the economies of friendly nations, or deny foreign operators a return on their investment. We need to import oil and perhaps always shall.

Certainly the long-range outlook is optimistic. Demand should increase steadily and may overtake supply in a year or two or three. And 10 or 20 years from now the market may need supplementing by much bigger imports despite maximum production here. The present market glut is undoubtedly temporary.

But right now and for the next several months there is a lot more oil available than consumers are likely to use—so much too much as to threaten the stability of the domestic industry. True, this threat has not yet curtailed drilling or capital investment but the threat is real nevertheless.

A temporary crisis calls for temporary measures. Some—unfortunately not all—producing states have made heroic efforts to reduce the national oversupply of crude.

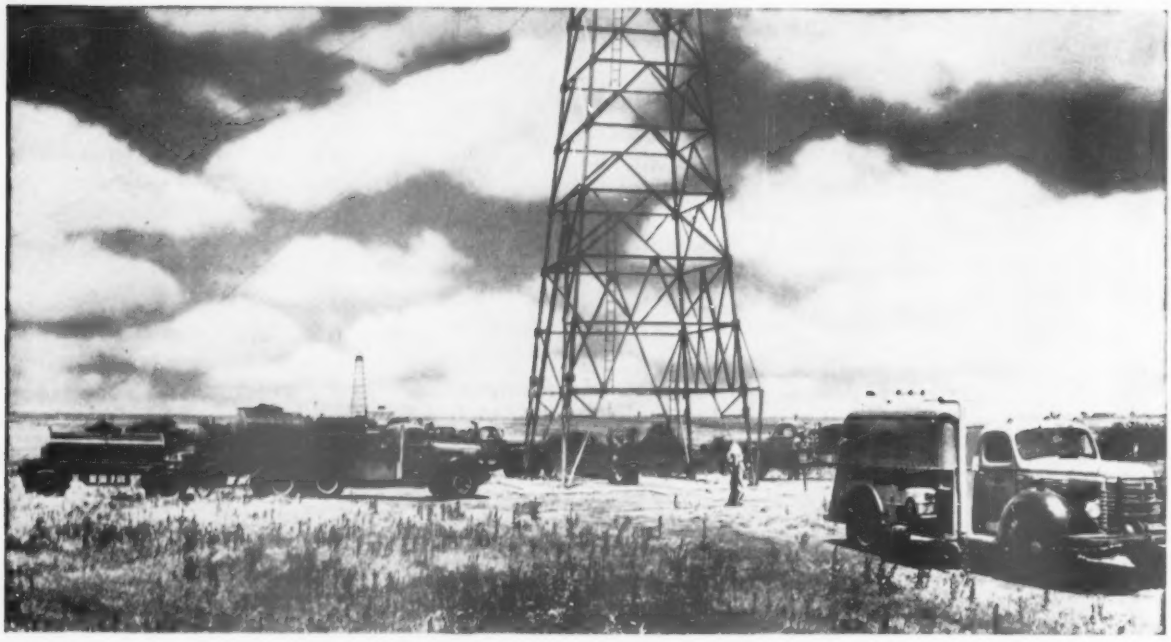
It is disheartening to heavily prorated domestic producers to see their efforts to restore market balance offset by continued high imports and the forecasts of still higher imports in coming months. All they ask is that importers share with them the responsibility of preventing a wastefully glutted market this winter.

SOME importers have taken realistic steps to adjust their shipments to the current facts of market demand. The problem would be solved if the others—there are fewer than a dozen—would realize that the import plans they made months ago were too optimistic and should be whittled down now.

In all their talk about imports—and there will be a lot of it this winter—a clear distinction should be made between long-range objectives and forecasts and the current, temporary condition of the domestic market. The long-range objectives can best be preserved by temporary action to alleviate the immediate problem.

SELECTIVE ACIDIZING SOLVED DIFFICULT RECOMPLETION

Production increased from 10 to 120 BOPD following acidizing workover



A problem existed in this newly deepened well: How to acidize the bottom zone while the depleted upper sections remained exposed in the open hole. It was recognized that an acid treatment by conventional methods probably would not be successful.

For this reason, it was decided to use the Dowell Electric Pilot on the job. The Selective Acidizing electrode was seated at the bottom end of the tubing string just above the new pay zone. Two pumps were used at the surface, one on the tubing and the other on the casing. Acid was pumped down the tubing, oil was pumped down the casing. The acid-oil interface was adjusted to the electrode level and maintained throughout the treatment by altering the pumping rates at the surface. This provided positive indication that the acid entered the lower zone.

As a result, production was increased from 10 BOPD to 120 BOPD.

If you would like to know more about Dowell's Selective Acidizing, the Electric Pilot, and the many other Dowell oil field services available to you, be sure to call the nearest Dowell office. Or, if you prefer, write directly to Tulsa, Dept. K-11.

DOWELL SERVICE

Acidizing • Fracturing • Electric Pilot • Perfojet
Paraffin Solvents • Bulk Inhibited Acid • Jelflake®
Corban® • Chemical Cleaning for Heat Exchange Equipment

DOWELL INCORPORATED • TULSA 1, OKLAHOMA
A Subsidiary of The Dow Chemical Company

"First in Oilfield Acidizing . . . Since 1932"

Look to **DOWELL**
FOR OIL INDUSTRY CHEMICAL SERVICE

THIS WEEK... ...IN THE NEWS

INTERNATIONAL—Terms of Glenn McCarthy's 35-year concession on 970,000 acres of undeveloped and unproved lands in Gran Chaco Province of southeastern Bolivia revealed. . . . ¶Basrah Petroleum makes what appears to be a new field discovery on the Rumaila structure in southern Iraq. . . . Preliminary tests of wildcat 20 miles west of Zubair field developed good show slightly below 10,000 ft. . . . ¶Fourth productive well in Wafra field of Neutral Zone completed for 4,500 bbl. daily. . . . ¶Saudi Arabia and Iraq governments hold discussions aimed at unified approach to operating oil companies. . . .

TIDELANDS—The legal staff of the Department of Interior completes proposed regulations for oil and gas leasing and development on the Continental Shelf. . . . Rules are to be submitted to the industry for comment and suggestions within the next few days. . . . They will differ from those under the Mineral Leasing Act because of the necessity of granting larger leases and protecting navigation. . . . ¶Bascom Giles, Texas land commissioner, proposes a swap of submerged lands between the federal Government and Texas to eliminate dual authority on leases overlapping the state-federal boundary offshore. . . . About 180,000 acres is involved in the proposal laid before Interior officials. . . .

WINTER IS APPROACHING again, and this scene in northern Alberta will be repeated many times over before the spring thaws arrive. Midwinter is the best time of the year for oil exploration in much of Canada, because only when the swampy muskeg is frozen solid is the transportation problem minimized. Here, members of a seismic crew are picking up cable and geophones after shooting in a wildcat area.

PIPE LINES—Transcontinental announces $80,000,000 expansion program to increase deliveries to New York-New Jersey area. . . . Project involves 533 miles of 30 and 36-in. main-line looping. . . . ¶Indiana Standard begins deliveries through 244-mile products line between Whiting refinery and River Rouge, Mich. . . . ¶New company formed by Minnesota individuals to move gas from Tioga and Beaver Lodge fields to cities in North Dakota. . . . Project calls for 500 miles of 12-in. and smaller pipe, outlay of $12,500,000. . . . ¶Tennessee Gas withdraws FPC application to increase delivery to New York and Philadelphia. . . .

PRODUCTION—Tex Harvey Oil Co. revives a year-old application for approval of a water-imbibition experiment on its Floyd 15 lease in the Spraberry Trend area. . . . ¶Full-scale gas injection is now under way under a 4,656-acre unit of the South Cuyama field of California with 22,000 M.c.f. of gas being injected through five wells daily.

REFINING—North Star Oils, Ltd., reveals plans to spend $7,000,000 for construction of new 8,000-bbl. refinery at St. Boniface, Man. . . . ¶Kansas Public Health Board orders five state refiners to have water-pollution abatement plans ready by January 1, 1955. . . . Refiners are Anderson-Prichard, Socony-Vacuum, Skelly, El Dorado Refining, and Vickers Petroleum. . . . ¶Rothschild Oil Co., Santa Fe Springs, becomes first independent California refiner to install a Platforming unit. . . . ¶Standard Oil of British Columbia lets contract to Fluor for construction of 3,750-bbl. fluid catalytic cracker at Burnaby refinery. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,243,925 bbl. daily for week ended November 21, up 23,850 bbl. daily. . . . ¶Total well completions for the week increased 39 wells to 1,006. . . . ¶Wildcat completions decreased 9 wells to 189. . . . ¶Rotary rigs operating the U. S. increased 30 rigs during week ended November 23 to 2,829, the first report above 2,800 this year. . . .

TRENDS—The number of wells drilled so far in 1953 represents an increase of about 7 per cent over same period last year. . . . Total footage is up only about 5.7 per cent. . . . The gain in total wildcat completions has been about 6 per cent. . . .

Texas Flares Are Dimming

- **Railroad Commission's 12-year battle against waste has paid off in conservation of state's natural gas**
- **Plant facilities for processing casing-head gas in Texas have more than doubled in the past 7 years**
- **Gas transmission lines have increased takes from 106,000,000 cu. ft. to 300,000,000 M.c.f. in same time**

AUSTIN.—Real progress in stopping the flaring of casinghead gas in Texas is noted by Railroad Commissioner William J. Murray, Jr., as he surveys past results and looks toward the day when all avoidable waste of gas will have been stopped.

"It's a far cry from the day when a gas company spokesman, asked by the commission to take some casinghead which was going to waste, said his company refused to be the 'scavenger for the oil industry,'" Murray said. "Now the pipe lines are scouring the state for casinghead contracts. Every week there is someone from a gas company in our office, combing the records in search of uncommitted casinghead to buy."

Murray's official interest in stopping waste of casinghead dates back to 1941, when he was the commission's chief engineer.

"Back then, I would take to the commission each month a list of the 10 biggest fields from the standpoint of flaring," Murray said. "When we started on that, none of the top 10 was flaring less than 50 million feet per day, and the top one was over 200 million feet a day."

Now, 12 years later, there isn't a field that is flaring even as much as 10 million feet a day.

Many factors have gone into the changing of that picture. Among them:

... Pressure by Commissioners Ernest O. Thompson, Olin Culberson and Murray to stop flaring. In some cases they have even used the drastic method of an oil shutdown to accomplish it.

In 1941, many fields had permissible gas-oil ratios of as high as 5,000/1, and under some allocation formulas based on extremely high potentials, some wells, under the gas limit rules, produced with ratios as high as 16,000/1 in the North Cowden field without penalty. Now, the standard ratio limit is 2,000/1, and in some fields the commission has adopted even lower ratio limits.

... Billions of dollars spent by the industry in conserving casinghead. The gasoline plant operators in Texas have shot up tremendously since World War II.

Where there were 175 plants of all kinds processing gas in December 1946, there now are 357. The current figure includes 181 gasoline plants, 22 pressure-maintenance plants, and 154 others, including separators, dehydrating plants, drips, and scrubbers. Daily intake has gone up from 125 to 278 billion cubic feet a month, of which 196 billion is casinghead. The number of oil wells has gone up from 45,837 to 64,786.

... Natural-gas pipe lines expeditures and facilities to back the lines totaled $4.25 billion during the 4 years ending in 1952, the American Gas Association has estimated. It predicted that almost that much will be spent during the current 4 years, about half of it on transmission lines and the rest on compressor, distribution and plant facilities.

How much of that was spent to gather and transmit Texas gas is indicated by the fact that transmission line takes in Texas have grown from 106 million feet a month in 1946 to as much as 300 billion a month in 1953.

In 1945, Commissioner Murray was chairman of an industry committee which gathered what information was available from meager records and estimated that a billion feet of casinghead was being flared each day, out of 2.5 billion produced. At the time, Murray recalls, some said the estimates were too high, but he thinks closer study has proved that they were very conservative.

Oil production has risen, waste of casinghead has been reduced, yet there is still about 700 million feet of casinghead being flared daily, out of 4.1 billion produced. Actually, Murray thinks now that 1945 flaring must have been as high as 2 billion feet a day, and he is pleased that it has been reduced to one-third of that amount.

Revised reporting . . . Commission reporting forms were revised in August 1952, and now it is possible to tell how much gas is being flared. Prior to that change, the only flaring actually reported to the commission was the flaring of either unprocessed or residue gas at plants. The first month the new reports were tabulated, the total of casinghead being flared "officially" rose from 1,393,901 M.c.f. to 26,590,355 M.c.f. Since then, the reductions in Spraberry and the 14 fields connected to the Phillips Goldsmith plant have brought the figure down to 21,000,000 M.c.f. a month.

The report for August 1953 shows a reduction of 23.47 per cent in flaring from August 1952. Where 85,418 oil wells were saving 116,354,799 M.c.f. of casinghead in August last year 88,719 wells were saving 128,700,890 M.c.f. in August 1953. Part of this gain is due to improved reporting since the new forms were first instituted, but part is due to the decrease in flaring from 28 to 21,000,000 M.c.f.

Carbon black on wane . . . Another factor in the gas picture which the bald statistics don't show, Commissioner Murray went on, is the fact that much casinghead is being used now for higher purposes.

For example, eight carbon black plants closed in Texas in the last 14 months. They were all old channel black plants. As their old cheap gas contracts ran out, they were forced to close because they can't afford to operate at modern gas prices, even on casinghead.

The changed attitude of the pipe lines toward casinghead has been a major factor in providing a market for the increasing amounts of saved casinghead. Murray recalled a case, a few years back, where a major transmission line was flaring 45 million feet a day of its own gas, while it had 25 million in unused compressor capacity. As a matter of policy, they wouldn't put casinghead in their pipe line.

"Now they're pretty glad to get it," Murray commented. "About five times

as much casinghead goes to pipe lines now as it did 5 years ago."

Spraberry . . . The commission has used various techniques to curb flaring. Spraberry is the most recent example. There, the commission found 220 million feet a day being flared. First, the commission just shut down the wells which weren't connected to the plants. That hit the courthouse in a hurry, and the Supreme Court held that order to be invalid. So the commission came right back with another one, setting oil allowables on the number of days which would produce the amount of casinghead the plants could handle.

First it was 9 producing days a month. As added plant capacity has been developed, Spraberry has been increased to 11 producing days. But there is theoretical plant capacity waiting for every well that ties on. Again, the commission found that its estimates on flaring had been conservative. The plants are virtually loaded on 11 days, with about 20 per cent of the wells still shut in.

Ector County . . . The earlier case of the 14 fields connected to the Goldsmith plant in Ector County was handled somewhat differently. The commission cut the fields back to the amount of casinghead the plant could take, and capacity was expanded rapidly. Now the Goldsmith plant has capacity to handle up to 22 days' production, and is thought to be the largest gasoline plant in the state. In July, it had 2,070 wells connected and took 7,180,814 M.c.f. of gas. Flaring is necessary there only when a unit breaks down.

What next? . . . Where will the commission turn next? Well, that's a decision yet to be made, but through the years, the commission has generally moved on the field with the greatest amount of flaring, or in which there was a possibility of getting the gas handled.

Will flaring ever be stopped completely? Murray doesn't think so. In most fields, there are some isolated wells which can't economically be connected to a gathering line. New fields are always being brought in, and during the period from discovery until its casinghead potential is established, there are no plant or pipe-line facilities to handle the casinghead, so it must necessarily be flared.

"It's a problem that never stays solved," Murray said. "New fields and increasing gas-oil ratios in old fields make it something the industry must work on constantly.

"But we're making headway, and we're going to keep after it."

How to Meter Accurately

Meticulous meter-maintenance program is key to precise measurement of flow through an orifice, N.G.A.A. told

AMARILLO. — Flow measurement with an orifice meter will be accurate only if a good meter-maintenance program is carried out, W. R. Kehoe, American Meter Co., Inc., said here November 20.

Speaking during the Panhandle Plains regional meeting of the Natural Gasoline Association of America, Kehoe said special attention should be given to deviations from ideal flow conditions, since possibilities for measurement in such situations increase enormously. For example, when suspended matter is found in the flowing stream, these factors are often encountered:

. . . The upstream edge of the orifice becomes rounded, leading to low differential reading and to an indication of less flow than that actually occurring.

. . . Accumulation of dirt in the meter run ahead of the orifice plate causes either low or high measurement. If the opening is not obstructed, low measurement results. Partial closing of the opening leads to high measurement.

. . . Low measurements result when the orifice surface becomes roughened.

Recalibration . . . In all meter applications the differential gage on the orifice meter should be recalibrated at intervals, depending on the type of meter service, Kehoe said. A comparison of the manometer reading with a suitable water column will indicate not only whether the gage calibration is correct, but will reveal flaws in the mechanism.

Any apparent change in calibration should be investigated as a possible result of friction, incrustation on the manometer walls, or from foreign material in the manometer chambers. Check valves should be cleaned and adjusted. New seat disks should be installed where soft-seated check valves are used. The bourdon static pressure element used in gas measurement should be calibrated carefully with a dead-weight tester at frequent intervals.

Increased accuracy . . . Other practices, which should be adopted to achieve increased meter accuracy, Kehoe said, are:

1. Proper notations, such as change of orifice size, should be made on charts.

2. Burrs which protrude into the line should be removed.

3. Meters should be damped carefully. Comparison of meter reading with water column differential will quickly show overdamped condition.

4. Pinching one or both of the inlet valves on the gage-line manifold should be avoided.

5. Meters should be checked periodically for leakage, especially if consistently low or high readings are obtained.

6. The orifice plate should be sized so that minimum flow corresponds to 10 per cent or more of the scale and so that maximum flow is comfortably below the 100 per cent mark.

Effective safety program . . . When management attempts to avoid responsibility for the oil and gas safety program, trouble is inevitable, A. Ross Rommel, assistant chief safety engineer, Humble Oil & Refining Co., told the group.

The successful safety program, he said, demands management and supervisory leadership, participation, personal spark, and thorough knowledge and active application of these fundamentals:

1. A poor accident record parallels an inefficient, expensive operation.

2. Accidents, with few exceptions, are the byproducts of operating mistakes. This is strongly indicated by the fact that 90 per cent of all industrial accidents involve procedure and method, and only 10 per cent reflect equipment failure.

3. An accident record parallels employe relations and morale. A good employe attitude breeds a good accident experience. Bad morale means a bad accident record.

4. Frequency of accidents breeds severity of accidents. This is not generality but fact. The more skinned fingers and bruised legs, the more probability of lost fingers and broken legs.

5. Safety is a state of mind—a philosophy or an attitude. It can only be fostered to maximum effect by management and supervisors. The employes generally reflect the attitude of management. If safety is ingrained in management philosophy it will rub off on the employes.

6. Disruption by accidents cost. Family disturbance, physical suffering, shutdowns, equipment damage, cannot be measured in dollars and cents. For every dollar which can actually be attributed to the expense of an accident, the best authorities in the safety field say that four more dollars have been expended intangibly.

Imbibition Approval Asked

AUSTIN.—Tex-Harvey Oil Co. has asked Texas Railroad Commission approval of a water-imbibition experiment on its Floyd 15 lease in the Tex-Harvey area of the Spraberry Trend Area field.

The commission granted permission for the experiment a year ago, but because of the field shutdown and other problems it was never started. Harry P. McClintock, Tex-Harvey manager, told the commission his company has studied the imbibition project carried on by Atlantic Refining Co. and has reached the conclusion it has been beneficial in increasing oil recovery.

McClintock said five wells on the lease will be converted for injection of 500 bbl. of fresh water daily in each. He asked for a 1-year test period to start no later than December 15 and requested lifting all gas-oil ratio restrictions and lease allowables and asked full well allowables of 121 bbl. per producing day regardless of results of last capacity tests. He said the wells currently produce 3 to 5 bbl. daily.

Antitrust Appeal Date Set

AUSTIN.—The Court of Civil Appeals here has postponed hearings until March 3, 1954, in the state's 4-year-old antitrust suit against 10 Texas refining companies.

The postponement was the third since the case was filed by former Atty. Gen. Price Daniel in 1949. It charges 10 companies—Arkansas Fuel Oil Co., Cities Service Oil Co., Magnolia Petroleum Co., Continental Oil Co., Gulf Oil Corp., Humble Oil & Refining Co., Standard Oil Co. of Texas, Sinclair Refining Co., The Texas Co., and Phillips Petroleum Co. — with acting jointly to boost the wholesale price of gasoline when federal price controls ended.

The trial court decided for the companies, endorsing their contention that the charges were too vague to answer and that the state failed to show cause for action. The appeal is being made by the current attorney general, John Ben Shepperd.

Industry Briefs

ST. BONIFACE, Man.—North Star Oils, Ltd., plans construction of an 8,000-bbl. refinery on a 173-acre tract here at an estimated cost of $7,000,000. The plant is expected to be completed early in 1955.

SHREVEPORT, La. — The British American Oil Producing Co. will move its district offices here to Tyler, Tex., in January. The new offices will occupy one-third of a floor in the new 10-story Bryant Petroleum Building being completed in Tyler. Five persons will be transferred in the move from Shreveport. Other personnel will be employed in Tyler as the need arises.

SARNIA, Ont.—Building permit valued at $670,000 has been issued to Imperial Oil for its refinery laboratory to be constructed in connection with its Sarnia plant, and preliminary work has been started on the site. The laboratory, with its equipment, will cost around $1,000,000 and will be completed in 1954.

TORONTO.—Shell Oil Co. of Canada, Ltd., has introduced a new corrosion preventive called Sonitor. The new additive is designed to prevent the corrosion occurring at the bases of heating oil tanks where condensed water vapor collects. Application of Sonitor once every 3 years should practically eliminate tank failures from this type of corrosion, according to Shell.

VANCOUVER, B. C.—Fluor Corp., Ltd., has been awarded a contract for construction of a 3,750-bbl. per day fluid catalytic cracking unit to be built as a part of the Burnaby refinery being built by Standard Oil Co. of British Columbia, a subsidiary of Standard Oil Co. of California.

OKLAHOMA.—Oklahoma's Corporation Commission last week set the state's allowable for both December and January at the same figure for November—485,000 bbl. daily. Actual production during November averaged more than 517,000 bbl.

BATON ROUGE.—Louisiana cut its December allowable by 7,785 bbl. for a daily average of 659,632 bbl. compared to a November allowable of 667,417 bbl. daily. The reduction was the third since September.

INDUSTRY AFFAIRS

What About Resources?

More than 1,000 will look at what we have, try to decide at Washington conference this week what will be needed

WASHINGTON.—Answers to a number of problems affecting our future oil supply will be sought this week at the Mid-Century Conference on Resources for the Future.

More than 1,000 persons, 122 of whom have expressed particular interest in energy resources, will attend the conference December 2-4, sponsored by Resources for the Future, Inc., a nonprofit organization aimed at implementing the recommendations of the Paley Materials Policy Commission.

Basic questions to be considered at the sessions of the Energy Section are outlined in a paper prepared by a steering committee of which Austin Cadle, economist with Standard Oil Co. of California; Leonard F. McCollum, president of Continental Oil Co., and J. French Robinson, president of Consolidated Natural Gas Co., are members.

Problems of future oil supply have been accentuated by developments of the past few years, the paper noted. Prime dependence for technological improvements has been placed on the normal operation of our industrial system. More profits are the fruits of successful research and good business, but one of the shortcomings of "normal" market forces in a time of international tension is that developments not immediately profitable but important to national security usually require specific industry - government arrangements.

"At the same time encouragements are being offered, our non-renewable resources are being used at record rates," the committee warned. "We need therefore to review continually the adequacy of the rewards for development of new fields and for recovery of a larger share of underground supplies."

Where incentives are needed . . . The major problems will concern the exploration and development of new producing areas and utilization of poorer grades of underground supplies. The committee expressed confidence that the necessary capital can be raised and the production personnel recruited, but cautioned that meanwhile it is important that the country extract its oil and gas reserves at rates consistent with maximum recovery.

Unless major new sources are discovered it may be necessary to expand oil imports, and thus it is to the interest of the United States to promote

development abroad "to have available complementary supplies when the needs of this country rise," but this "requires some consistency and policy with respect to imports."

In the realm of synthetic fuels the committee anticipates that oil from shale will prove economical before other sources but pointed out that oil from the Athabaska tar sands of Canada "also is a significant potential." High investment costs and, in the case of shale and tar, heavy transportation costs to markets are seen as stumbling blocks to quick development of a synthetic-fuels industry.

"Unless there is special national security need for early development of synthetic fuel on a production scale, it may be expected that commercial production will be postponed until the rising cost of natural liquid fuels makes synthetics economic and minimizes the risk of loss," the paper said.

"The proportion of our total liquid-fuel requirements which might be expected to be produced as synthetic fuels in 1975 would then be based on the expected requirements, supply, and price of natural liquid fuel as well as on the costs of synthetic fuel.

"Should national security require early production of synthetic fuels, industry probably would have to be given some public assistance, either in investment of federal funds or in setting of adequate prices."

Problems to be tackled . . . Here are some of the oil questions the conference will attempt to answer during its December 2-4 meeting:

What energy sources will expand most rapidly in the next 25 years? How long will oil and gas gain in competition with coal?

Are imports of oil needed? Should exports be discouraged? Should supplies of high-grade resources be reserved for future users? For national defense? Can high-grade uses be encouraged?

Are liquid fuels likely to become a major use of coal in the next 50 years?

Should some agency be responsible for assembling and analyzing information on energy? How could this activity promote exploration, conservation, and wise use?

Are the present rewards for exploration sufficient?

How is the degree of recovery of underground supplies improving?

How have improvements in production techniques affected output from old wells? From new ones?

Could regulation of mining and production result in greater realization of deposits? Should output be controlled on a comparable basis among the producing states? Is interstate regulation of the movement of fuels equitable? Is it consistent with conservation?

What is the outlook for further gains in conservation in production and distribution? What are the likely future improvements in transportation?

What areas of research should be encouraged in order to attain maximum use of our fuels and stretch out our reserves?

How can better government and industry cooperation be established? Are the areas of public and private responsibilities adequately defined? Is there need for a national organization concerned with the energy resources?

What steps, if any, should be taken in respect to our interest in international energy resources?

Drilling Surges

Rotaries active in U. S., West Canada at new high

DRILLING activity continued its upward trend during the past week, boosting the number of operating rotary rigs in the United States and western Canada to a new high level for the year.

The 2,978 rigs reported running during the week represented an increase of 20 over the number operating the previous week, and more than 100 over the number active a month ago.

The new high now lacks only 54 rigs of equalling 1952's peak number of 3,032 rigs running the middle of last December. With drilling being maintained steadily above last year's level for corresponding periods, normal year-end increases in activity are expected to boost this year's peak number of active rigs well above the 1952 high.

Largest gains in activity continue to be felt in the West Texas and Rocky Mountain areas, and particularly in the latter area where drilling has climbed to an all-time record level.

ACTIVE ROTARY RIGS*

Area—	Week ended 11-23-53	Change week ended 11-16-53	Change week ended 11-24-52
Gulf Coast	591	+ 3	— 39
N. & W. Tex.-N. M.	874	+20	+ 9
Ark.-N. La.-E. Tex.	200	— 3	+ 46
Oklahoma	376	—13	+ 36
Kansas-S. Nebraska	166	+ 6	— 24
Illinois-Eastern	152	— 6	+ 10
Rocky Mountains	300	+15	+ 63
Pacific Coast	170	+ 8	+ 2
Total U. S.	2,829	+30	+103
Western Canada	149	—10	— 27
Total	2,978	+20	+ 76

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, and the Rocky Mountains and western Canada areas are shown on pages 163 and 164.

Husky Proposes Separation

CODY, Wyo.—Stockholders of the Husky Oil Co. will vote here December 7 on a proposal to separate the parent company from its Canadian subsidiary, Husky Oil & Refining Co., Ltd., allowing the two firms to operate independently of each other.

Terms of the proposal call for holders of Husky common to receive one share of the new proposed Canadian corporation for each two shares held, provided the internal revenue department rules the transaction will not result in a taxable gain for stockholders. Husky owns 60 per cent of the Canadian subsidiary.

The company said recent additions to the management organization of Husky Canada have "substantially reduced" the dependent relationship of the subsidiary on the parent company and the board of directors has come to the conclusion it would be in the best interests of both companies to separate.

CANADA

New Cat Cracker Planned

VANCOUVER.—Standard Oil Co. of British Columbia, Ltd., a subsidiary of California Standard, has contracted with Fluor Corp. of Canada, Ltd., for construction of a 3,750-bbl. per day fluid catalytic cracking unit at the Vancouver refinery. The unit will be a Model IV design, licensed by Standard Oil Development Co.

Standard's refinery is being expanded from the current 8,350 bbl. per day to 11,000 bbl. per day. The $10,000,000 modernization project includes new facilities for gas recovery and treating in addition to the cat cracker. Construction is due to begin next spring, with completion scheduled for October 1954.

Alberta Production Up

EDMONTON, Alta.—Gross sales of Alberta-refined petroleum products in the first 9 months of this year totalled $87,087,590, according to statistics compiled by the provincial department of industries and labor.

This was a 7 per cent increase over the $81,400,762 of the corresponding period a year ago and almost $5,000,000 greater than the sales for the whole of 1951.

Petroleum production in the first 8 months in Alberta totalled 47,404,407 bbl., a 31 per cent increase, while the value of sales in this period was $115,341,495, compared with $86,889,250 in the corresponding period of 1952.

Gas Bill Pending

Touchy question of U. S.-Canadian exports and imports may be dropped in the lap of newly created committee

THE whole question of whether or not natural gas will move in either direction over the U. S.-Canadian border could conceivably be tossed into the lap of a new joint committee of American and Canadian cabinet ministers appointed recently to consider mutual trade and economic problems.

The one action which might push the gas question onto this committee's agenda is a bill now before the House of Commons which would give the Canadian Parliament the power to exclude imports of gas from the United States.

A government-sponsored bill, it could be passed in a matter of weeks because the administration of Prime Minister St. Laurent has comfortable majorities in both houses of the parliament.

In the face of the Federal Power Commission's approval of a plan to export roughly 62,000,000 cu. ft. of gas daily to Toronto markets *(The Oil and Gas Journal, September 7, page 65 and October 12, page 92)*, the bill is even more significant.

The FPC approved a plan whereby Consumers Gas Co. of Toronto would receive gas bought by Niagara Gas Transmission Co. in the U. S. Gulf Coast area and sent north through the system of the Tennessee Gas Transmission Co. to the border. Niagara would build the additional line north to span the border. The plan would need Canadian Government approval before it could become effective. In view of the government sponsored bill in parliament, that is now questionable to say the least.

The proposed importation of gas from the United States is viewed in some Canadian quarters as a definite threat to lagging plans for the movement of Alberta gas to markets in eastern Canada. The markets of Montreal and Toronto are essential to the success of any pipe line carrying Alberta gas eastward. It is not likely that the Canadian Government will allow the project to be jeopardized.

Some observers view the gas-exclusion measure before parliament as a lever on the FPC which is now considering a proposal to allow a Canadian firm to pipe Alberta gas southward to the northwestern sections of the United States. Westcoast Transmission, Ltd., proposes to move Alberta gas to Vancouver and the Pacific Northwest of the U. S. Pacific Northwest Pipeline Corp. wants to serve the area from San Juan basin gas fields.

Ottawa government authorities have denied this "lever" motive attributed to the legislation and declare that plans for exporting Canadian gas to the United States must stand on their own merit.

The plans for eastward movement of Alberta gas to Canadian markets without competition from gas from the United States is another matter. The government of Alberta still has not acted on either of two proposals for pipe lines. In fact, it has been the inability of the Alberta government to settle on a plan for moving available gas from Alberta that has added greatly to the problem.

Two companies seek a franchise to pipe gas from Alberta. One, Trans Canada Pipe Lines, Ltd., would build an all-Canada 30-in. line from Alberta to Toronto, a 26-in. line on to Montreal and an extension to Ottawa, farther eastward. The other, Western Pipe Lines, Ltd., would build a line south to Winnipeg and across the border to Minneapolis with an eventual extension to the eastern markets of Canada.

The new legislation before parliament would be effective protection for either of the two proposals—if the Alberta government grants its approval to either. It would require a special act of the parliament to incorporate any company seeking to import gas. The Board of Transport Commissioners would have jurisdiction over such companies and would issue specific permits for the operation of such companies.

Thus, if the FPC should refuse to approve the plan to move Alberta gas into northwestern United States and the Canadian Government should refuse to grant its approval to moving Niagara's gas into Toronto, the whole question might become a subject for consideration on an international governmental level.

Salt Water Disposal Urged

EDMONTON, Alta.—The Alberta Petroleum and Natural Gas Conservation Board has warned operators in the Leduc-Woodbend producing area that steps must be taken soon to construct a suitable disposal system for the increasing amounts of salt water from wells in the region.

The board has informed operators that in August the total salt water production from the Leduc-Woodbend area was 45,000 bbl. This is an increase of 80 per cent over August 1952.

The board's engineering staff in the Devon area in September confirmed the existence of an immediate disposal problem in the McLeod, Kavanaugh and Calmar fields and a deteriorating situation in both the Devon and Woodbend regions.

The conservation group has asked that suggestions for a salt water disposal scheme be submitted to the board by January 1.

I. N. McKinnon, chairman of the board, has warned that the board intends to take appropriate action to reduce the salt water disposal problem through curtailing production or shutting in wells that are considered to be causing an especially serious situation.

Plant Expansion Planned

TORONTO, Ont.—Completion of additional gas wells in Jumping Pound gas field has prompted the second expansion in 2 years of Shell Oil Co. of Canada's Jumping Pound gas-processing plant 20 miles west of Calgary.

In announcing the expansion plans, W. M. V. Ash, company president, disclosed extensions to the plant will increase capacity to 70,000,000 cu. ft. a day—almost tripling the original plant capacity of 25,000,000 cu. ft. daily.

Contract for the plant expansion has been awarded to Refinery Engineering, Ltd., Toronto, with construction to start immediately.

Shell is also considering expansion of the sulfur-extraction plant operated in conjunction with the gas-processing plant. The present sulfur plant, first of its kind in Canada, has a rated capacity of 30 tons per day. The sulfur produced is consumed by Canadian pulp and paper industries.

Unit to Produce Ammonia

FORT SASKATCHEWAN, Alta.—Sherritt-Gordon Mines, Ltd., will shortly commence operations of a $19 million metals refinery, including a $2 million unit for the synthesis of ammonia from natural gas here.

When in full production, the plant will take about 4 billion cubic feet of natural gas per year, supplied on a 20-year contract by Mid-Western Industrial Gas Co.

Most of the ammonia will be consumed at the refinery as a leaching agent in refining nickel, cobalt and copper ores, but some excess will be marketed. As byproduct, about 65,000 tons per year of ammonium sulfate will also be produced for sale.

Inhibitors at Work

Chemical agents reduce corrosion in thousands of wells and will become standard in refineries, N.A.C.E. is told

D. H. Stormont

LOS ANGELES. — Chemical inhibitors, which are performing an admirable job in mitigating corrosion in thousands of oil wells, are doing an equally effective job in many refineries and natural-gasoline plants.

Their use in the latter service is expected to become standard practice in the future, G. E. Purdy of Tretolite Co. told members of the National Association of Corrosion Engineers at the annual meeting of the western division here.

Success of their use in California wells was reported by Frank Davie of General Petroleum Corp., chairman of the technical committee making the study. R. S. Crog, research supervisor for Union Oil Co., described them as being possibly the best method for corrosion control in oil wells.

Refinery experiences . . . In catalytic cracking units, organic inhibitors have proven effective in the prevention of hydrogen blistering. They also are reducing corrosion in ethanolamine sweetening systems, and in other types of process equipment too numerous to mention, Purdy declared.

Because they are relatively inert, there is little or no effect on the various catalysts used in refining, he said. Neither do they react, in general, with the chemical washes or treatments to which the hydrocarbons are conventionally subjected. Also, as they contain both hydrophilic and hydrophobic groups, they are distributed in both oil and water to provide protection in both phases.

Economical and easy to use, they also are excellent detergents. This action he explained as:

"The deposition of corrosion products, such as iron sulfide, copper sulfide, etc., and salts formed as a result of pH control, such as ammonium chloride and ammonium sulfide, on heat exchangers and condensing equipment is many times more responsible for shutdowns than is corrosion.

"These salts, being polar, tend to deposit or bake onto the water-wetted metal tube surfaces. Through use of the inhibitor, which forms a film over the surface, the metal becomes preferentially oil-wetted. Under these conditions the salts no longer tend to deposit, but are removed with the accumulator water drawoff."

As an example he cited a refinery where pH adjustment by ammonia was the only method of corrosion control used. With this treatment, iron content of the water drawn off was in the range of 50 to 70 p.p.m. Immediately following use of organic chemicals, iron content increased rapidly for a few days, indicating the removal of corrosion products by the detergent action of the inhibitor. Continued use, with the pH being controlled to approximately 8.0, resulted in the iron content averaging only 0.20 p.p.m.

Inhibitors in oil wells . . . Frank Davie in delivering the report of the committee on corrosion of oil and gas-well equipment declared that more than 2,500 California pumping wells were being chemically treated. Preliminary data compiled on 344 of these showed the inhibitors were doing an excellent job in reducing corrosion.

These showed that in the average well: rod jobs had been reduced from 0.296 per month to 0.160 per month; tubing jobs from 0.260 to 0.076 per month; total jobs from 0.722 to 0.351 per month; and pumps replaced were lowered from an average of 0.254 per month to 0.163 monthly. The average well had been under treatment for 21.1 months, with the before-treatment data covering 22.2 months.

Crog said Union Oil Co. in one area alone had more than 30 wells being treated with inhibitors. Records indicate the savings attributable to the program average as much as $400 per well per month.

Oil-tanker corrosion . . . Another portion of Crog's "Observations on Corrosion in the Oil Industry," dealt with oil tankers. Increasing use by the oil industry has led to more complicated corrosion problems, with internal appearing to be far more costly than hull corrosion he declared, adding:

"It has been estimated a tanker in light-oil service has an economic life of less than 10 years. The principal factor affecting such life is corrosion. . . .

"The problem is made complex by the fact that in light-oil service many of the tankers are restricted to short hauls handling a variety of products. This necessitates frequent tank cleaning and return trips in ballast. A conventional and effective tank cleaning process involves 'butterworthing,' which in essence is a high-pressure wash with hot salt water. Unfortunately corrosion problems are magnified by such a cleaning process."

Cathodic protection to protect tanks in ballast and corrosion inhibitors to protect empty product tanks are proving satisfactory. Also he expected that coatings will be developed, from the several plastic coatings in process of being tested, which will be satisfactory for use in commercial tankers.

Gas Injection Under Way

LOS ANGELES.—Full-scale gas injection is now under way in the Dibblee zone of the South Cuyama field, with approximately 22,000 M.c.f. of gas daily being returned through five injection wells.

Gas-repressuring operations were started last July following unitization of the field's principal oil reservoir. The unit extends over approximately 4,656 acres and includes the properties of Richfield Oil Corp., Bell Petroleum Co., and Monterey Oil Co.

Officials of Richfield, unit operator, estimate gas injection and unitization will result in an additional 40,000,000 to 80,000,000 bbl. of crude being recovered.

Harbor Sinking Slows

LONG BEACH.—As forecast by engineering studies, the rate of land subsidence in the Long Beach Harbor area last year slowed down. At the center of the bowl-shaped sinking area a decline at the rate of 1.69 ft. per year was recorded. The year before the computed rate was 2.35 ft.

The reduced rate almost exactly tallied with the figures forecast by Harbor Department engineers, who estimate total subsidence will be about 26 ft. when the predicted end is reached in 1965. To date the center has dropped about 20 ft. Harbor Department officials estimate they will have to spend approximately $120,000,000 in earth fills and in elevating oil wells and producing facilities affected by the subsidence.

Stock Buildup Slows

Lower supply, higher demand pare daily increase during September in California to 50,000 bbl., agency reports

LOS ANGELES. — Stock increases, which had been at a 100,000-bbl. per day level earlier in the year, dropped to only 50,000 bbl. daily during September, the Oil Producers Agency reported in its monthly summary.

Preliminary figures indicate a further drop to 20,000 bbl. daily for October, the report stated. Total stocks were estimated to have been 121,058,000 bbl. at the end of October and were believed to be only about 300,000 bbl. higher in mid-November.

The lesser rate of increase in stocks was credited to the combined effect of lower supply and higher demand. Lower supply was due to reductions in both foreign imports and domestic receipts from states outside District 5.

Crude imports, the report stated, had averaged more than 100,000 bbl. daily in recent months and 81,000 bbl. daily for the first 8 months of the year. In September, however, they dropped to 78,000 bbl. and were estimated to have maintained that rate in October.

"Announced plans of the principal importing company that it intended to reduce its rate of importation, coupled with plans of other companies to slow their development programs, indicate the lower supply level will be maintained over the next several months," the agency said.

Nine-month comparisons . . . For the first three-quarters, total supply in District 5 averaged 1,219,000 bbl. daily, 86,000 bbl. more than in the like period of 1952. It consisted of a 15,000-bbl. gain in crude production, a 4,000-bbl. gain in gas-liquids production, and 67,000 bbl. daily in increased imports. Total demand averaged 1,136,000 bbl. daily, a gain of 46,000 bbl. over the like 1952 period.

Gasoline . . . Supply averaged 479,000 bbl. daily, of which 24,000 bbl. were shipped into the district. The total was 49,000 bbl. daily higher than in 1952, and receipts were 11,000 bbl. higher. Demand averaged 458,000 bbl. daily, an increase of 26,000 bbl. over the 1952 average. Stocks increased 5,731,000 bbl. as the result of supply outstripping demand.

Stove and diesel oils . . . Supply was 162,000 bbl. daily, or 4,000 bbl. less than the 1952 9-months' average due to a drop in refinery output. Demand was 149,000 bbl., a drop of 2,000 bbl. daily. A gain of 3,614,000 bbl. was recorded in stocks.

Residual fuels . . . Supply averaged 376,000 bbl. or 7,000 bbl. daily more than in the 1952 period. Demand was 367,000 bbl., or 21,000 bbl. daily above the 1952 average. Stocks increased 2,435,000 bbl. during the 9-month period, an average gain of 9,000 bbl. daily as compared with an average 23,000-bbl. gain in 1952.

Water Floods Stepped Up

LOS ANGELES.—Increased waterflooding operations are being undertaken at the Dominguez field, southwestern Los Angeles area, where experimental floods have been under way for the past 6 years.

The expanded program is being undertaken jointly by Union Oil Co. and Shell Oil Co., which control almost the entire field. Initial activity will be confined to the upper portion of the 400-ft. thick first Callender zone, in the East Central pool. First injection well for this flood is being drilled. It is planned to then expand operations into other of the field's eight oil zones, which occur at depths between 3,700 and 7,500 ft.

Union has had trial floods under way in two zones since early 1947, injecting from 2,000 to 3,000 bbl. of water daily. These maintained, or increased, oil output from these pools whereas total Dominguez production declined about 3,000 bbl. to the current 10,000-bbl. daily level.

ROCKY MOUNTAIN

North Dakota Gas Contracted

ST. PAUL.—The first transmission line to carry North Dakota natural gas —a 500-mile, $12,500,000 project— will be built by a newly formed independent company, North Dakota Natural Gas Transmission Co.

The company, headed by Emmett Butler, St. Paul, last week contracted with Amerada Petroleum Corp. for purchase of gas from North Dakota's Tioga and Beaver Lodge fields, where Signal Oil & Gas Co. is now building a gasoline plant.

J. A. Andersen, Minneapolis, is executive vice president, and F. J. McArthur, St. Paul is secretary-treasurer. Headquarters is in St. Paul, but operating office will be in Minot, N. D.

North Dakota Natural plans a 12-in. line from the Signal plant near Tioga eastward to Minot and on to Fessenden. Here the line will fork, with one 10-in. line extending north to Devil's Lake and on to Grand Forks. The other leg will run southward to Jamestown and from there to Fargo, with an 8-in. line running on to Wahpeton.

Initial capacity of the line will be 30,000,000 cu. ft., with provision for increasing it later to as high as 60,000,000 cu. ft.

Cost of the gas was not disclosed, but will be "something under" 20 cents per M.c.f. The line will be privately financed, North Dakota Natural officials said. An application for necessary certificates with the state Public Service Commission was filed last week.

Signal's gasoline plant, the state's first, is expected to be in operation by next summer and is designed to process 40,000,000 cu. ft. of gas daily. A gathering system has been completed.

Signal built the plant under an agreement with Amerada which provides that Amerada will retain ownership of the gas and will receive a portion of the income from Signal's sale of products.

Tax-Law Revision Proposed

DENVER. — A proposal that the present graduated 2 to 5 per cent severance tax on crude-oil production in Colorado be changed to a flat rate, possibly 4 per cent, will go before the 1954 Colorado legislature.

The state's present law provides for the graduated levy with a withholding provision on payments to royalty holders and a deduction of ad valorem taxes paid by the companies to counties.

Leader of the move to change the tax is State Senate majority leader Frank L. Gill. Objections to the present measure mostly are that the counties share of the proceeds is too small.

Railroad Closes Oil Deals

BILLINGS, Mont.—New agreements for the development of Northern Pacific Railway Co. lands in Montana have been announced by LeRoy H. Hines, vice president of the railroad.

Two agreements have been made with Socony-Vacuum Oil Co., Inc., covering lands in the Weldon area of McCune County providing for royalty and working interest for the railroad. An operating agreement with Eramont Petroleum, Ltd., Trans-Era Oils, Ltd., and Albermont Petroleums, Ltd., all of Canada, give the railroad a percentage participation in production from 9,000 acres in the Enid area, Richland County.

Imports: Pro and Con

Coal industry, oil importers present opposing arguments to commission that has not yet heard from independents

WASHINGTON.—If the Randall Commission on Foreign Economic Policy had any idea there is no conflict of views on the question of oil imports, that idea was dispelled last week.

The commission heard the widely divergent views of oil importers and domestic fuel producing industries—and is still to hear from representatives of the nation's domestic oil producers.

Standard Oil Co. (N. J.), speaking for the importers, told the commission any further curbs on international trade "should be avoided as injurious to our country" and plugged for an even further reduction of present "deterrents to international trade" to an extent "consistent with national security."

The Foreign Oil Policy Committee, on the other hand, contended that the coal industry stands as our bulwark in case of emergencies and as a restraint on "monopoly actions of foreign interests in peacetime." As such it must not be "displaced" even if it is "less efficient" than the oil industry generally.

A third view, that of the domestic oil producers, is being presented by the Independent Petroleum Association of America. It will follow more closely the coal line than that of the importers, but will not close the door as firmly against imports to supplement domestic fuel supplies.

Coal's view . . . Both the F.O.P.C. and the I.P.A.A. have expressed resentment over the refusal of the Randall Commission to allow them to testify at previous hearings. The F.O.P.C. charged others "with a known predilection for free trade" were invited to appear.

R. E. Snoberger, chairman of the F.O.P.C., which represents the coal, railroad, and related industries, told the commission that others have "sought and obtained protections which for the most part goes far beyond what coal seeks" to cope with the problem of unrestricted residual imports. He included among them wheat and cotton growers and "even the domestic oil industry with its vast motor-fuel market."

Importer's stand . . . Standard minimized the danger of war to overseas oil sources, declaring any such argument assumes future conflict would be fought entirely from bases in the United States. The company pointed to contributions of foreign oil development to our national security and said ability to keep an aggressor from our shores would be severely handicapped if the armed forces had to depend on domestic fuel sources.

Standard also took issue with claims that heavy fuel imports have been the chief cause for decreased coal output and pointed to the increasing use of natural gas and dieselization of railroads.

Standard claimed that demand for oil in the United States will outstrip the upward trend of domestic oil production.

"The development and maintenance of sources of oil supply abroad, as a supplement to domestic resources, are dictated by considerations of national interest," the Standard report contended.

Shelf Rules Near

Industry to get look at operational regulations

WASHINGTON.—Proposed regulations for oil and gas leasing and development on the Continental Shelf are expected to be laid before the industry for comment within the next few days.

Prepared by the legal staff of the Interior Department, the regulations, which will become effective early in January, will lay open for exploration and development the whole area of submerged oil, gas, and sulfur resources beyond the boundaries of the coastal states.

The department is laying down the ground rules for operation along lines somewhat different from those followed under the Mineral Leasing Act for public-lands leases because of the necessity for giving lessees larger tracts in which to work and the need to protect navigation. Operators on the Continental Shelf will work under a combination of land and maritime laws, but the department is seeking to make the burden of the latter as light as possible.

Exploration of the shelf area has been under suspension since the Supreme Court decision in the Texas and Louisiana cases, in which the federal Government was held to have "paramount rights" to the resources of the submerged lands below the states' low-water mark.

Legislation enacted by Congress this year restored the states' so-called historic boundaries and all resources within them but reserved to the federal Government all rights in the area between those boundaries and the outer edge of the Continental Shelf. The states-rights measure has been attacked in the courts by two states, and its constitutionality is expected to be determined by the Supreme Court. These cases, however, do not affect the validity of the Continental Shelf Act.

Land Swap Studied

Government eying Texas' tidelands-exchange offer

WASHINGTON.—A proposal for an exchange of submerged oil lands between the federal Government and the State of Texas to eliminate dual authority in leases straddling the boundary between the state and federal portions of the Continental Shelf is under consideration by the Interior and Justice departments.

About 180,000 acres of submerged lands is involved in the proposal with the Government and the state each transferring 90,000 acres on their sides of the boundary so that leased areas along the line will fall into the exclusive jurisdiction of the Government or the state.

The dividing line runs parallel to the low-water line 10.35 miles out at such angle that one corner of square lease blocks of both the federal Government and the state would run over the line.

Survey line favored . . . The idea of a transfer was laid before Interior and Justice officials this month by Texas Land Commissioner Bascom Giles. He pointed out that there are many disadvantages to a boundary that follows the shore and a number of advantages if the line could follow surveys. Unless the survey lines are used, he said,

leases will be split by the boundary and lease holders will have to deal with two agencies instead of one.

"Many problems of well spacing will arise, and leases will be less valuable under divided ownership," Giles explained. "The zig-zag boundary would be for limited purposes for the present, principally for oil and gas development."

Interior officials appear to be receptive to the proposal which, however, would require legislation by Congress to become effective. The idea was laid before the Senate Interior Committee when it was considered legislation governing the Continental Shelf, but the committee felt it was too complicated a matter to be included in the bill.

NPC Meet Set

Final 1953 session slated December 3 in Washington

WASHINGTON. — The final 1953 meeting of the National Petroleum Council has been called by Chairman Walter S. Hallanan for December 3.

Normally to be held toward the end of the month, the meeting was advanced 3 weeks in order to permit the Petroleum Administration for Defense to be liquidated by December 31 if, as expected, recommendations now being prepared by an NPC committee call for such action.

A study of the government oil and gas organization to succeed PAD was asked of the council in October. PAD officials believe the defense situation will permit the agency to go out of business 6 months earlier than originally contemplated. However, on the possibility that it may be necessary to continue it, they have already asked the Budget Bureau for funds with which to operate for another year after next June 30.

Their presentation to the bureau, however, was purely formal as part of the process now going on of preparing the budget for the fiscal year 1955, which must be submitted to Congress in January.

The NPC committee is expected to come up with a plan for reconstitution and expansion of the Oil and Gas Division of the Interior Department, whose personnel since 1950 has been a part of the PAD organization. The OGD, in addition to the work for which it was originally set up, would take over the unfinished business of PAD, including such action as might be necessary to increase alkylate facilities.

In addition to the report on government oil organization, Hallanan said, the meeting next month will receive reports from the committees on oil and gas exploratory and development requirements and federal lands oil and gas policy

Imports Quiz Slated

Latin American oil's war role due committee study

WASHINGTON.—Spokesmen for the coal industry, domestic oil producers and oil-importing companies will tell a Senate Interior subcommittee this week the part played in our economy by Latin American oil.

The subcommittee, headed by Sen. George W. Malone of Nevada, is studying the Western Hemisphere fuel and minerals supply from the standpoint of its adequacy in the event of war.

A number of representatives of the government and the interested industries are scheduled to discuss oil during the course of hearings set for 2 days but likely to run twice that long.

The subcommittee will have before it a report on United States-Latin American Relations submitted to President Eisenhower by his brother, Dr. Milton Eisenhower, who headed a party which visited 10 South American countries last summer.

Eisenhower report . . . Eisenhower's report emphasized the necessity for supporting Latin America's economy by opening our markets to its products, pointing to the situation during the last war when Germany made every effort to cut our oil supply from Venezuela. The report warns that South America must be kept strong if the same situation is not to recur in the future.

The best method of establishing a strong South American economy is by U. S. investment and development, but "unhappily," Eisenhower said, "the need for foreign capital is accompanied throughout most of Latin America by a rising tide of nationalism.

Eisenhower found the situation uneven, some countries exhibiting a favorable attitude toward U. S. investment and a full recognition of its contribution to economic development. In others he found mild resentment over the growth of operations and in still others communist propaganda had gained support.

Similarly, the attitudes toward American enterprises now operating were also mixed. Because the companies are foreign, represent large amounts of capital and tend to expand, they are the targets of communists and ultra-nationalists but, Eisenhower said:

Import "apprehension" . . . "Most thoughtful Latin Americans realize that the days when some foreign-owned enterprises might exploit local populations are gone. Today, United States enterprises usually pay higher wages to their employes than local employers do, and also provide better housing, working conditions, schools, hospitals and highways. They pay very substantial sums in taxes, and provide excellent technical training programs in many instances."

The report noted the "serious apprehension" expressed in Latin America over measures proposed in Congress to restrict imports of petroleum and certain other commodities.

Coal industry witnesses appearing before the Malone subcommittee will, on the other hand, emphasize the need for restrictions, particularly on residual fuel, to protect coal markets.

PAD Successor

Interior oil, gas division revival to be recommended

WASHINGTON.—A National Petroleum Council committee is expected to recommend this week that the Oil and Gas Division of the Interior Department be reconstituted on an enlarged scale as successor to the Petroleum Administration for Defense.

The committee's report will be submitted at the final 1953 meeting of the NPC December 3. A study of the government-industry organization to be set up upon the liquidation of PAD was asked of the council at its September meeting.

PAD and Interior officials also have been working out ideas for the revival of the OGD. Established originally to take over from the Petroleum Administration for War in 1946, the OGD was merged with PAD when the latter was created in 1950.

Under both the council report and Interior proposals it is expected that the revived OGD will get all of the remaining responsibilities of PAD but without the latter's authority to direct the oil industry. The Secretary of the Interior, however, will continue to hold all authority conferred upon him by the President's 1950 proclamation setting up the emergency organization under the Defense Production Act. The act still has 19 months to run, expiring June 30, 1955.

Liquidation of the emergency oil agency and transfer of its functions can be accomplished without delay and with no legal difficulties, department officials said. The OGD could operate

through the remainder of the current fiscal year on funds already available, and a budget for the fiscal year which begins next July 1 is now in course of preparation.

Present department plans call for an agency of about 35 people with an appropriation in the neighborhood of $300,000, plus the $150,000 a year now allowed for enforcement of the Connally "Hot Oil" Act. It is not expected that the OGD will have any men from the industry serving without compensation, as has PAD. While the authority to use such men, given in the Defense Production Act, will hold until July 1955, it is not believed that the oil companies would be willing to send men to Washington in the absence of an emergency.

Tax-Aid Crackdown

ODM vexed by increasing number of shelved projects

WASHINGTON.—The Office of Defense Mobilization is cracking down on the holders of certificates for accelerated amortization of new oil and other facilities who do not begin construction within the time limit specified in each certificate.

The matter of "floating certificates" has been of concern to the ODM for a long time. A recent survey showed that a lot of companies holding tax authorizations do not start work within the given period, but come in for extensions of time.

The Petroleum Administration for Defense has been directed to be more "hard-boiled" in its attitude toward extensions and recommend them only if the applicant can show he has good reason for not having started construction. The general rule has been that a start on any part of a project costing under $1,000,000 satisfies the requirements of the amortization certificate. If the project is to cost more than $1,000,000, construction must be started on each segment of it within the time limit.

Under the expansion program a lot of companies have secured certificates for projects on which they have deferred construction when it became apparent the supply situation was one of surplus rather than shortage. The number of projects shelved has never been determined, but it is said to be considerable percentagewise.

Expansion Program Eyed

WASHINGTON. — The Office of Defense Mobilization is making new studies of the oil situation and may come up with changes in present expansion programs early next year.

This will be part of a "new look" at the defense program as a whole in the light of current conditions of plentiful supplies in a number of industries.

There is nothing in the picture to indicate that ODM will take any action to curtail the expansion programs, but the idea rather is to determine whether economic conditionts late next winter will indicate the necessity for further immediate increases.

By that time it is expected that many of the programs for this year will have been completed and the general economic situation will have shaken down.

GULF COAST

Transco Expanding

Program includes looping 533 miles, adding compressors, and storage plan to boost deliveries in New York area

William P. Sterne

HOUSTON.—An $80,000,000 expansion program is planned by Transcontinental Gas Pipe Line Corp. to increase delivery of natural gas to the New York - New Jersey - Philadelphia metropolitan area by 265,000,000 cu. ft. daily.

If the Federal Power Commission approves, Transco plans to:

. . . Loop 533 miles of its Texas-to-New York line with 30 and 36-in. pipe, adding additional compressor stations to boost daily delivery capacity by 130,000,000 cu. ft.

. . . Store 135,000,000 cu. ft. of gas daily in Oakford reservoir near Pittsburgh and by an agreement with Texas Eastern Transmission Corp., draw an added supply into its own system as needed to meet peak-day winter demands.

Over-all peak-day capacity would be boosted by 265,000,000 cu. ft. daily, from 555,000,000 cu. ft. to 820,000,000 cu. ft. daily.

The plan has been designed to meet estimated future needs of metropolitan utility companies on the "most economical basis," Tom P. Walker, president of Transco, said.

Transco's bid for increased deliveries to the eastern metropolitan area is the second filed in recent weeks. Tennessee Gas Transmission Co. asked for FPC authority to increase deliveries and then withdrew its application for amendments (see this section).

Storage plan . . . Under the storage plan, Transcontinental will have approximately 12 billion cubic feet of gas in storage which will add 135,000,000 cu. ft. per day to the company's winter delivery capacity beginning November 15, 1954, Walker said.

It will not be necessary to purchase additional gas for this service as quantities available during the summer will be diverted to storage for winter delivery.

"Assuming no undue delay in securing the necessary approval from the FPC, Transcontinental would be able on peak days to bring 690,000,000 cu. ft. of gas per day into the metropolitan area markets by November 15, 1954, and a total of 820,000,000 cu. ft. daily by November 15, 1955," Walker said.

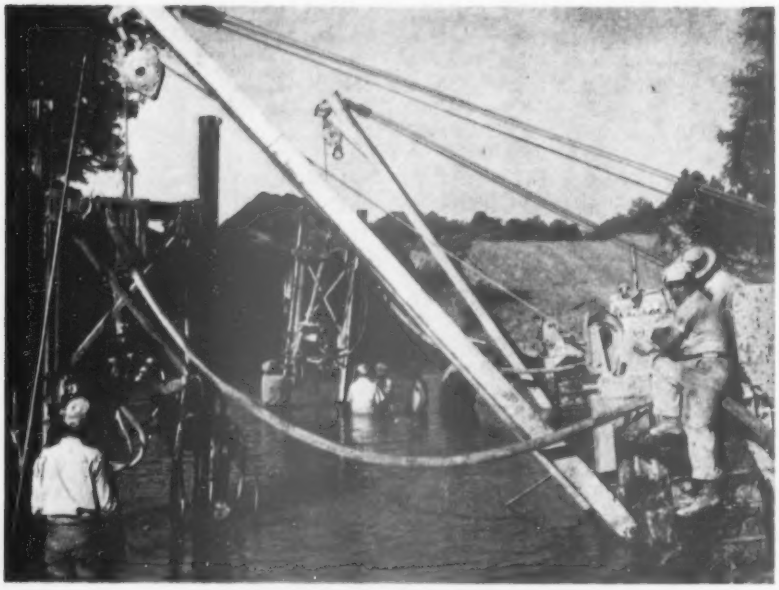
He said negotiations are now under way to purchase sufficient quantities of natural gas at prices "which will affect our present cost structure the least." He said that assurances have been obtained from bankers that within the limits of proposed rates, "the new facilities can be financed."

First to New York . . . Transco brought natural gas to Greater New York for the first time 3 years ago when it completed its 1,840-mile, 30-in. line from southern Texas to New York City. It was at that time the longest single pipe line ever built and cost, with subsequent improvements, about $268,000,000.

Two underwater lines, one across the Hudson River at 134th Street, and another across the Narrows of New York Harbor to Brooklyn, provide separate points of delivery within New York City.

Transco's system taps about 60 gas fields in the Gulf Coast areas of Texas and Louisiana. Present authorized capacity is 555,000,000 cu. ft. daily, of which 418,000,000 cu. ft. is authorized for delivery to utilities in the New York - New Jersey - Philadelphia areas. A total of 251,000,000 cu. ft. goes to the New York market alone. The remainder is made available to 38 other public utilities along the line in Maryland, Virginia, North and South Carolina, Georgia, and Alabama.

Gulf Interstate Nears Half-Way



Mark on 860-Mile Big-Inch Line

HOUSTON.—The major portion of pipe laying on Gulf Interstate Gas Co.'s 860-mile natural-gas transmission system from southern Louisiana to northeastern Kentucky is expected to be completed before contractors are forced to shut down for the winter.

Sam A. Taylor, Houston, vice president of the company, says good weather has enabled contractors to lay more than 400 miles of 30-in. pipe in less than 4 months. All river crossings in the system are completed or in the final stages, work is well advanced on more than 200 miles of gathering lines in Louisiana, and work has started on five compressor stations to serve the system.

The entire $130,000,000 project is due for completion by November 1954. The system will be capable of delivering 375,000,000 cu. ft. of gas daily to United Gas Co.'s system near Kenova, W. Va. The gas will become part of a pool supply for Columbia Gas Systems, Inc., with which United Fuel is affiliated.

Principal contractors on the job are H. C. Price Co., Bartlesville, Okla., laying 355 miles of 30-in. line, and Houston Contracting Co., laying the remaining 505 miles. Other contractors include Associated Pipe Line Constructors, Inc., Anderson Brothers Corp., and Williams Brothers Co., who are laying 230 miles of gathering lines; J. Ray McDermott, river crossings of the Mississippi, Ouachita, and Red rivers; Missouri Dredging Co., crossings on the Tennessee, Kentucky, and Cumberland rivers; and Tellepsen Construction Co. and J. F. Pritchard & Co., five 8,000-hp. compressor stations.

T.G.T. Amending Program

HOUSTON.—Tennessee Gas Transmission Co. last week withdrew its application with the Federal Power Commission for authority to increase its deliveries to the New York-Philadelphia metropolitan area. T.G.T. wants to amend its application.

The withdrawal came after Philadelphia Electric Co. said it wanted to buy only 10,000,000 cu. ft. of gas daily instead of the 30,000,000 cu. ft. originally anticipated. The Philadelphia firm is one of several reported to have negotiated for the Tennessee gas.

Tennessee Gas's original plan would have increased delivery capacity 130,100,000 cu. ft. daily by constructing 243 miles of 24-in. line from northern Pennsylvania to the outskirts of New York City. *(The Oil and Gas Journal, November 16, page 187).*

Uniform Boundary Urged

BATON ROUGE, La.—Gov. Robert Kennon of Louisiana says Congress should establish a uniform boundary line in the Gulf of Mexico, to settle the question over large areas of the oil-rich lands off Louisiana's shores.

Gov. Kennon, in a report to the state, said settlement of the one remaining issue—the question of where the state boundary shall be located in the gulf, is an objective that is "worth an all-out effort."

The governor said that the issue will drag on for years if it is left for the courts to decide.

"Texas and Florida have established rather well their claim to 10½ miles in the gulf, and Mexico claims such an area," the governor said. "It would be awkward, to say the least, for the Louisiana boundary to dip within 3 miles of the coast."

LATIN AMERICA

Bolivian Concession . . .

- Provides for royalty scale up to 40 per cent
- Commits up to 10,000 bbl. daily to Argentina
- Exempts profits from taxes for first 5 years
- Deters expropriation by guarantees in escrow

Dahl M. Duff

GLENN McCARTHY'S 35-year concession in southeastern Bolivia provides for a graduated royalty up to 40 per cent and commits him to sell up to 10,000 bbl. daily of any production to Bolivia for resale to Argentina.

Other terms include an exemption from Bolivian profit taxes for 5 years after the first oil export, detailed drilling obligations and guarantees for the payment of compensation in case of nationalization by the government.

The Houston independent obtained the concession from the government oil agency, Yacimientos Petroliferos Fiscales Bolivianos, under several agreements, the last of which was dated May 11 of this year.

The area of approximately 970,000 acres, all undeveloped and unproved, is situated in the province of Gran Chaco near the Argentina border and is divided into two parts, Los Monos and Agua Salada. Across the border, 18 and 25 miles respectively from the concession area, are the two recently discovered Argentine fields of Madri Jones and Duran.

Drilling obligations . . . Following usual practice in Latin American oil concessions, McCarthy must relinquish 25 per cent of the area after 2½ years and another 25 per cent at the end of 5 years. Further reductions may be made at his option. After an initial 2½-year exploration period, he is required to undertake accelerated development and "during the life of the lease and in accordance with prudent methods of operation" to drill a minimum of one well for each 1,000 hectares, or each 2,470 acres.

The terms also required McCarthy to ship to Bolivia before the end of November a rig and other equipment needed for three 6,000-ft. wells. The equipment left Houston last week. He must commence drilling in the Los Monos area within 3 months after the arrival of the equipment in Bolivia. Another rig must be shipped before May 26, 1954, and drilling begun in Agua Salada within 3 months after its arrival. McCarthy posted $100,000 bond for performance with these terms; noncompliance subjects the concession to forfeiture without further notice.

Escrow guarantee . . . The compensation guarantee in case of expropriation consists of promissory notes signed by Y.P.F.B. and the Central Bank of Bolivia and deposited in escrow in the United States. The agreement provides that in case of expropriation McCarthy will be paid the depreciated value of his investment plus 15 per cent. The promissory notes are delivered to McCarthy in the event of expropriation.

The concession holder is obligated first to satisfy requirements of the Bolivian market from any production, selling to Y.P.F.B. at a price payable in dollars and equal to Gulf Coast less 15 per cent. For the sales to Argentina, Y.P.F.B. designates the quantities up to 10,000 bbl. daily and pays an agreed price which "shall be such as will not cause the lessee any loss in comparison with prices which (he) could obtain in other markets for oil of similar quality."

Royalty payments . . . Royalty is payable in kind at the well, based on monthly average production per well. The schedule steps up from 16½ per cent royalty for a well averaging 1 to 200 bbl. daily to 33 per cent for a 501 to 600 bbl. daily well and to 40 per cent for wells producing more than 900 bbl. daily.

McCarthy is required to sell to the

"Glenn-mobile" Designed for Bolivian Rails or Roads

William P. (Foots) Larkin thumbs a ride from his boss, Glenn McCarthy, in the latest in oil-field transportation—a combination jeep and rail car. Designed and built by S. & R. Tool & Supply Co., Houston, the "Glenn-mobile" will save time between McCarthy's headquarters office at Villa Montes and the first drilling site at Los Monos, Bolivia. Front and rear take-offs provide power for the rail car which will save about 120 miles of hard driving over rough terrain on each round trip to the drill site. Ramps are provided for driving on and off the rail car and power take-offs are easily disengaged. Speed is limited, but without heavy grades, the going will be steady and time-saving.

central bank all exchange earned by the operation but he may reacquire dollars at the same rate for expenses, amortization and dividends. Applicable Bolivian laws in this connection allow the withdrawal of 20, and in special cases 30 per cent annually of the original investment, and up to 15 per cent of profits based on the unamortized investment.

Concession mapped . . . The Los Monos and the Agua Salada anticlines, which will be the scene of McCarthy's initial operations, were mapped prior to 1937 by the Standard Oil Co. (N. J.) organization before its Bolivian concession was expropriated. Y.P.F.B. has turned the maps over to McCarthy who also has done an aerial reconnaissance of the structures. Only well drilled in the concession area was by Y.P.F.B. on the Los Monos structure. The well produced about 120 bbl. of light oil before it was abandoned 2 years ago because of high pressures.

Original rights over the concession acreage were obtained in June 1952 by Don L. Carroll, Kensington, Md., on behalf of Wendell Lund, Washington; James Gerity, Jr., Adrian, Mich.; and himself. The rights of this group were assigned to McCarthy for a 6 per cent interest in net profits of the operation payable after recovery of exploration development, and other expenses.

Under terms of the concession agreement, McCarthy must organize a Bolivian company within 3 years with at least $5,000,000 capitalization. In April 1952 he organized Glenn McCarthy, Inc., which has been given control of the Bolivian operation. This company recently offered $17,000,000 in common stock on the market. It is contemplated that the Bolivian subsidiary to be organized will be a subsidiary of Glenn McCarthy, Inc.

Bolivia's present production from three fields, Camiri, Sanandita, and Bermejo, amounts to about 1,400 bbl. daily against Bolivian consumption of around 3,000 bbl. daily. Two refineries with a capacity of about 9,000 bbl. daily and a connecting pipe line to the existing fields were built by Y.P.F.B. about 5 years ago, partly with loans from the Export-Import bank. Additional production is badly needed. The shortage of crude is such that water is used to push what oil is available through the pipe-line system.

MIDDLE EAST

New Field Indicated

Rumaila wildcat in Iraq finds same pay as Zubair

AN apparent new field discovery has been made by Basrah Petroleum Co., Ltd., on the Rumaila structure about 20 miles west of Zubair field in southern Iraq.

A wildcat test begun last February found production at a depth of slightly more than 10,000 ft. in the same formations as in Zubair field. An announcement by the company in London said that testing operations are now in progress. Initial results in the well were not disclosed officially.

Preliminary tests are said to have given very satisfactory showings. The formations are understood to be somewhat higher structurally than in Zubair field itself.

Rumaila adds another prospective producing area to the fields which now extend along the western side of the Persian Gulf from Arabian American Oil Co.'s Ghawar field northward to Zubair which is situated about 15 miles west of Basra. Rumaila itself is only a short distance north of the Kuwait-Iraq border.

Zubair zones . . . Basrah Petroleum is associated with Iraq Petroleum Co., Ltd., and has the same ownership. Zubair, now producing about 61,000 bbl. daily, was discovered in 1948. Individual wells produce about 5,000 bbl. daily. The third Zubair pay, in which wells in this field are completed, is a Lower Cretaceous sand at around 11,000 ft. It is this formation which presumably is being tested at Rumaila.

In Zubair, the fourth pay is another Lower Cretaceous sand 300 ft. deeper which in one well yielded 43°-gravity crude in comparison to the 35°-gravity oil taken from the third pay. The second Zubair pay is a Middle Cretaceous limestone with 26° oil and 3.8 per cent sulfur at 7,000 ft. The first pay is heavy asphaltic crude of 20° gravity and 4.5 per cent sulfur in the Lower Fars (Miocene) limestone at about 1,000 ft.

Like Zubair, development at Rumaila will be deep and expensive. Last year, for example, Basrah Petroleum operated five heavy rigs in Zubair and completed 10 wells. From February 14 to the end of September of this year,

Australia's New Large Refinery Under Construction

This view illustrates progress on the Kwinana refinery of Anglo-Iranian Oil Co., Ltd., near Fremantle in western Australia. It shows the furnace under construction for one of the two distillation units which have a total capacity of 70,000 bbl. daily. The complete Kwinana refinery is the largest of four projects currently under construction which will provide Australia with nearly 140,000 bbl. daily in new refining capacity. Prime contractor for the Kwinana project is the M. W. Kellogg Co.

the company had drilled a total of 407,712 ft.

Iraq, Arabia Talk Prices

Discussions aimed at a unified approach to the operating oil companies have recently been held by Saudi Arabian and Iraq Government officials in Baghdad.

Principal subject was the present differential between the posted price for crude oil and the price on which the 50-50 profit-sharing agreements are based. Arabian American Oil Co. has been asked to modify this arrangement to increase Saudi Arabia's oil revenue.

The discussions at Baghdad were a continuation of talks held early last summer at Riyadh in Saudi Arabia. The Iraq Government was represented by Dr. Abdul Rahman Al-Jalili, minister of economics, and Mohammed Al-Naguib, director-general for oil affairs. Abdullah Al-Turaiqi, director-general for oil affairs, represented Saudi Arabia.

Other oil pricing questions were taken up recently in an informal exchange of views between the Iraq Government and Sir Herbert Todd, chief representative in Baghdad for Iraq Petroleum Co., Ltd. These talks were described as exploratory with the intention of determining exactly the amounts due Iraq under the 50-50 agreement. Sir Herbert Todd is now in London reporting to company headquarters on the discussions.

New Wafra Well Completed

The fourth productive well in the Wafra field of the Neutral Zone has been completed and tests indicate it will produce 4,500 bbl. daily.

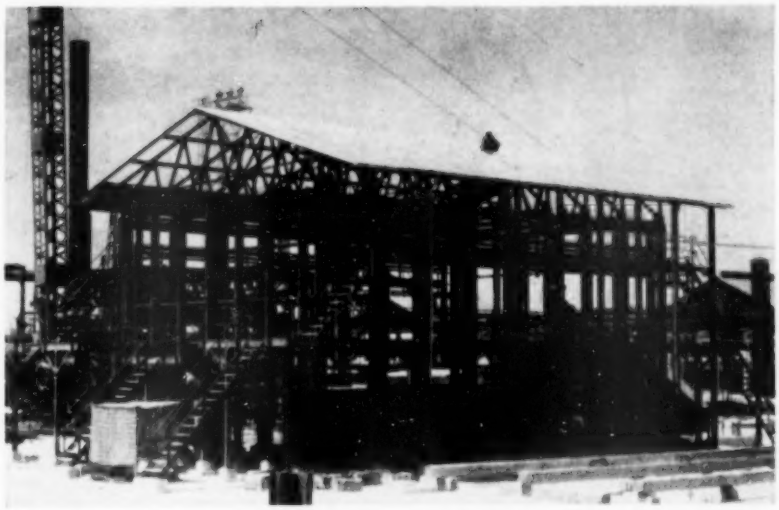
Ralph K. Davies, president of American Independent Oil Co., said the fourth well, located 1 mile north of the discovery, is the "highest structurally in the field to date and not only confirms the significance of the find, but somewhat expands our earlier estimates of the extent of the field."

A second rig is due to arrive in the Neutral Zone within a few days and the company plans to complete two development wells every 35 days in the comparatively shallow Burgan producing horizon.

American Independent's discovery well in March 1952 climaxed a 4-year search in which five dry holes were drilled and an estimated $30,000,000 spent in the Saudi Arabia-Kuwait Neutral Zone.

The three producers completed previously have all been shut in pending the completion of a 35-mile, 8 and 10-in. pipe line from the field to an offshore loading point at the head of the Persian Gulf.

Davies said construction of gathering lines, the pipe line and terminal facilities is proceeding according to schedule and he anticipates crude will move through the system to the terminal at Mena Abdulla, Kuwait, by the first of the year.



Iraq Unit Has Single Distillation Stage

A new stabilization unit with a capacity of 70,000 bbl. daily is being erected in Kirkuk field in northern Iraq to handle the increased production from this important Middle East reservoir. Scheduled to go into operation near the end of the year, the unit is designed to handle distillation in one stage instead of two. The equipment includes a 117-ft. fractionating column and a tube-still furnace with a heating capacity of 69 million B.t.u.'s an hour. The unit is being erected under the supervision of Foster Wheeler, Ltd., London.

AFRICA

Third Egypt Well Spudded

Southern California Petroleum Corp. has started a wildcat test on the Sidri structure 8 miles northeast of the Feiran 1 well in the Sinai Pensinsula in Egypt.

Southern California Petroleum is the operator for an exploration program being carried out by International Egyptian Oil Co. which is controlled by a Swiss banking syndicate. Southern California Petroleum has a 10 per cent interest in International Egyptian and an option on an additional 5 per cent.

Feiran 2, the first well in the program which was spudded September 30, is currently drilling toward a Miocene sand objective at about 6,500 ft. The Feiran 1 well is being produced at about 130 bbl. daily of 23°-gravity crude now being used to surface desert roads in the concession area.

The original Feiran discovery was made by Standard Oil Co. of Egypt in 1949 shortly before it abandoned exploration in the country in the face of an unfavorable legal situation. The equipment and exploration information of this Jersey Standard affiliate was bought by the Swiss group.

Tyler F. Woodward, president of Southern California Petroleum, said the next well to be undertaken after the Sidri test will be Baba 1, 8 miles due north of Sidri. The company currently has 17 Americans working in Egypt, including 10 drillers and 5 engineers and geologists.

EUROPE

Shell Tanker Firm Formed

The Royal Dutch-Shell Group has formed a new subsidiary, Shell Tankers, Ltd., to handle tanker operations.

The new company, which became operative November 1, is a 100 per cent subsidiary of Anglo-Saxon Petroleum Co., Ltd., one of the three main operating companies of Royal Dutch-Shell and hitherto the managing company for the Shell fleet.

Anglo-Saxon will continue to retain ownership of the Shell tankers, but the new Shell Tankers, Ltd., will take over all operational responsibilities and also will negotiate charters and contracts on behalf of Anglo-Saxon. The change was made for corporate reasons and to identify the Shell name with the group's marine activities.

Chinese Reds Try to Boost Production

This view, which is suggestive of some of California's producing areas, actually is in Northwest China where the Communist Government, with Russian help, is making strenuous efforts to increase the present small oil production. The picture is supplied by China Photo Service, and the caption does not specifically identify the area. China's current production is estimated to be about 4,000 bbl. daily, a level believed to have been made possible largely through Russian equipment and technical advice.

International Briefs

A wildcat to test a 300,000-acre concession on the northern edge of the Sechura Desert in Peru will be started within 30 days by Peruvian Petroleum Co., a joint operation of Cities Service Oil Co. and Richfield Oil Corp. Contract for the wildcat has been let to Santa Fe Drilling Co., Los Angeles, which has three rigs in Peru. The company holds concessions on approximately 2,500,000 acres in the Oriente area.

The first of several Platforming units being built at refineries in the United Kingdom has been completed by Shell at Stanlow. The unit, which cost the equivalent of about $11,000,000, was scheduled to go on stream last week. It will provide upwards of 110,000,000 Imp. gal. (about 8,600 bbl. daily) of basic aviation fuel annually, and this amount will be doubled by blending for the final product. Hydrogen produced in the unit will eventually be used to increase the refinery's production of elemental sulfur.

First production of microcrystalline waxes in the United Kingdom is scheduled to begin before the end of the year at the Llandarcy refinery in Wales. A special plant for the production of the waxes, now all imported from the United States, is nearly complete. The operating company is a subsidiary of Anglo-Iranian Oil Co., Ltd.

Two 19-mile pipe lines, one 16-in. and the other 6-in., are now being laid from the site of Anglo-Iranian Oil Co., Ltd.'s, new refinery in Aden to the bunkering station serving this busy port. The lines will carry more than 40,000 bbl. daily of various grades of ships' fuel to the storage serving the offshore bunkering berths.

The Conselho Nacional do Petroleo of Brazil has signed a contract with Foster Wheeler Corp. for the design and erection of a shale-oil installation at Tremembe, in the State of Sao Paulo. The official announcement of the contract in Rio de Janeiro said initial capacity of the plant will be 10,000 bbl. daily. The crude shale oil will be extracted from pyro-bituminous shale existing in the Taubate-Tremembe district where total shale oil reserves are estimated to amount to some three billion barrels.

Venezuelan Petroleum Co. (Sinclair) has reported completion of a second well in its Barinas discovery area in southwestern Venezuela. The No. 2 well produced at a rate of 1,607 bbl daily. This production rate was somewhat higher than that announced for the Sinco 1 discovery which flowed 312, 400, and 600 bbl. daily of 25.1° to 27.9° crude from three sands. The area is about 240 miles from the coast, and has no pipe-line outlet.

Esso Francaise, S.A., has bottomed its Mano 1 test in southwestern France at 9,014 ft., the limit of the equipment, and is testing back up the hole. No indications of commercial production have been obtained, and the company is preparing another location at Parentis, about 12 miles to the southwest. The Mano well was in the Lias of the Lower Jurassic at total depth. It was drilled by the French contracting company, Forex, which will also drill the Parentis well.

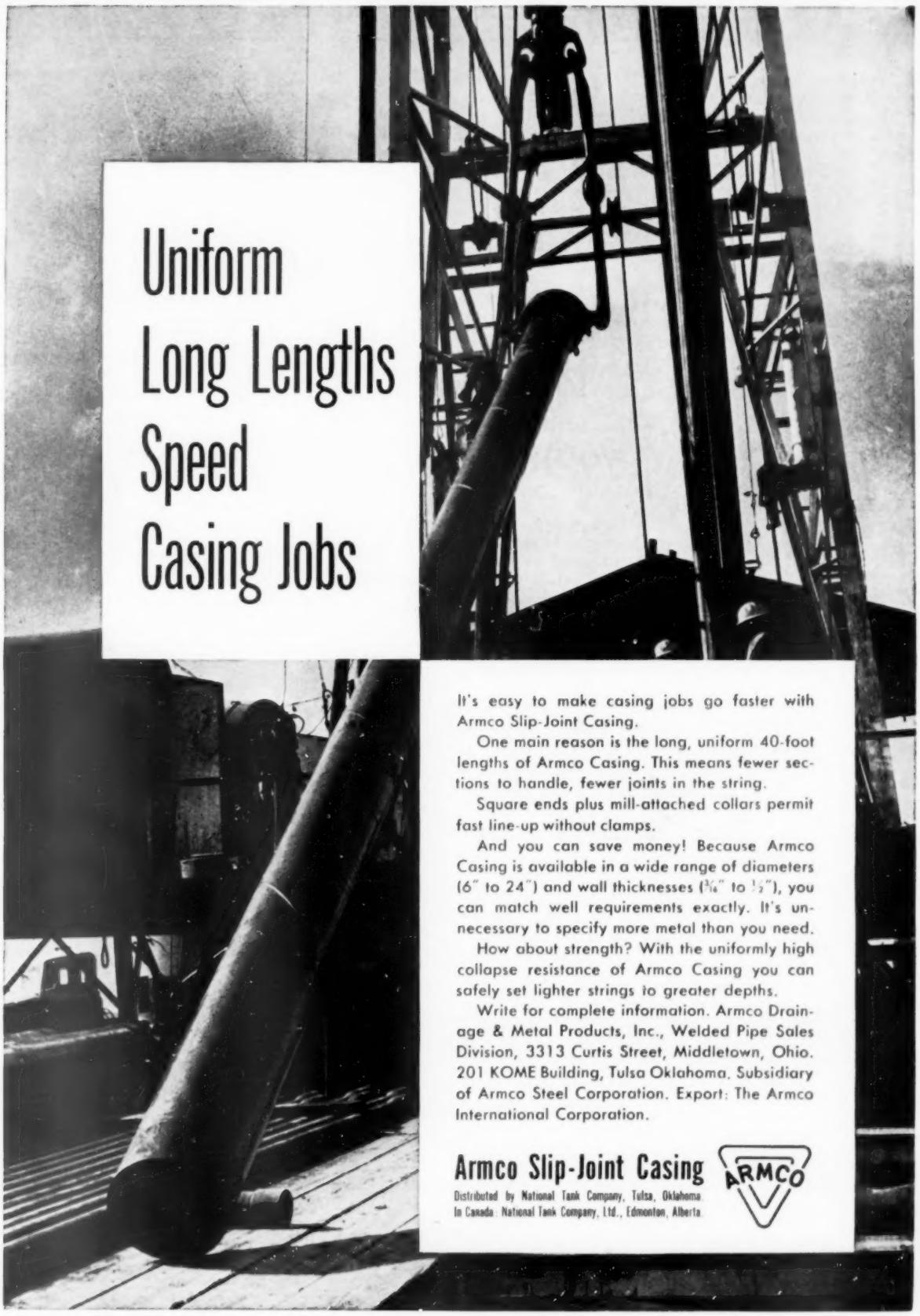
Gulf Oil Corp. is planning to carry out additional seismograph work on its concession in British Honduras after the first of the year following the end of the rainy season. Exploratory drilling will not be undertaken until the latter part of next year at the earliest.

Plans have been announced for a 10,000-bbl. daily catalytic cracker and a catalytic polymerization plant at the Antwerp, Belgium, refinery of Soc. Industrielle Belge des Petroles, S. A., owned jointly by Anglo-Iranian Oil Co., Ltd., and Cie. Financiere Belge des Petroles, S. A. (Petrofina). The new units will cost the equivalent of about $10,000,000.

A Danish company, A/S Kosangas Co. of Copenhagen, has placed in service a specially designed 660-ton motor vessel to carry L.P.G. from European refineries to Denmark. The L.P.G. is carried in 12 cylindrical tanks with a total capacity of 320 tons, or about 120,000 gal.

Petroleos Mexicanos has inaugurated a new storage terminal in Guadalajara, Mexico's second largest city, which is now connected by pipe line with the Salamanca refinery. Pemex officials in Mexico City said another products line extending from Salamanca to Morelia, is expected to be completed in the near future.

The Brazilian National Petroleum Council has received an additional credit from the government of 231,-350,000 cruzeiros ($5,000,000) for shale-plant and refinery construction and exploratory work. Most of the money is to be used for purchasing land, materials, and equipment for a shale-oil plant to be built in the Paraiba River Valley. Other funds will be spent for further improvements at the Mataripe refinery in Bahia and for development and exploratory work in the Marau area in Bahia.



Uniform Long Lengths Speed Casing Jobs

It's easy to make casing jobs go faster with Armco Slip-Joint Casing.

One main reason is the long, uniform 40-foot lengths of Armco Casing. This means fewer sections to handle, fewer joints in the string.

Square ends plus mill-attached collars permit fast line-up without clamps.

And you can save money! Because Armco Casing is available in a wide range of diameters (6" to 24") and wall thicknesses (¾" to ½"), you can match well requirements exactly. It's unnecessary to specify more metal than you need.

How about strength? With the uniformly high collapse resistance of Armco Casing you can safely set lighter strings to greater depths.

Write for complete information. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 3313 Curtis Street, Middletown, Ohio. 201 KOME Building, Tulsa Oklahoma. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

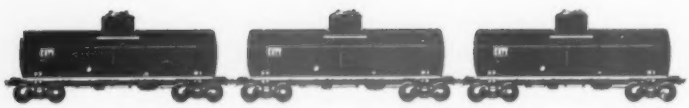
Armco Slip-Joint Casing

Distributed by National Tank Company, Tulsa, Oklahoma
In Canada: National Tank Company, Ltd., Edmonton, Alberta

ARMCO

before
you
start
laying
bricks
for
your
new
plant

see General American about GATX
cars to carry your bulk liquids



For dependability, the 46,000 tank cars in the GATX fleet are designed, built and operated by General American

GENERAL AMERICAN TRANSPORTATION CORPORATION

GATX GENERAL AMERICAN TRADE MARK

135 South La Salle Street • Chicago 90, Illinois
Offices in all principal cities

New Refining Head

Shell of Canada executive is former athlete, scholar

SHELL OIL CO. OF CANADA, LTD., can thank football and hockey, indirectly, for its new vice president in charge of manufacturing.

Dr. D. M. Morrison, M.B.E., who was named to the position recently, was granted Ph.D. degrees from both McGill and Cambridge universities but in his undergraduate days at the University of British Columbia, he was an indifferent student.

It was not until the native of Nova Scotia became a star athlete, distinguishing himself in both football and hockey, that Morrison settled down in his final year at U.B.C. and his scholastic record began to match his athletic marks in glitter. He specialized in physical chemistry and studied under top authorities in the field at both McGill and Cambridge.

Morrison first joined Shell in London in 1927. During the next 5 years he held several technical posts in U.S. Shell refineries and in 1932 was appointed assistant manager of Montreal East refinery. Two years later he took over the refinery as manager and remained there until 1938 when he moved to the Shell refinery at Martinez, Calif.

It was during World War II that Morrison added national honors to the athletic, scholastic and business laurels he had already earned. His service with the explosives branch of the Canadian Government's Department of Munitions and Supply earned him the Member of the Order of the British Empire distinction.

In mid-1944, Morrison returned to Shell's Montreal East refinery only to be recalled to government service in 1952 when defense purchasing threatened a shortage of materials. He first served as assistant and later as Director of Petroleum Division. His job was to determine and fill essential requirements for the rapidly expanding Canadian petroleum industry.

Morrison returned to Shell early in 1953 to become manufacturing manager and then was named vice president in charge of manufacturing.

He is a Fellow of the Chemical Institute of Canada, a member of the American Chemical Society and the Institute of Petroleum and is on the general committee, division of refining, of the American Petroleum Institute.

Rear Admiral Harold B. Miller, head of the public-information department of the American Petroleum Institute and executive director of the Oil Information Committee, has been named by President Eisenhower as director of the White House Conference on Highway Safety scheduled for February 17-19 in Washington, D. C. Miller was director of public information for the Navy Department prior to his retirement in 1946.

HOLMAN

Eugene Holman, president of Standard Oil Co. (N. J.), was presented the Capt. Robert Dollar Memorial award for distinguished services in behalf of foreign trade at the fortieth National Foreign Convention in New York. **James A. Farley,** former postmaster general and recipient of the award in 1952, presented the plaque to Holman. The convention is sponsored by the National Foreign Trade Council, of which the late Captain Dollar was a founder.

Donald C. Nellis, Shell Oil Co., has been promoted from mechanical engineer to division mechanical engineer at the company's Long Beach offices. **E. F. Lambert,** formerly junior engineer in the Los Angeles area offices, has been promoted to a development engineer and transferred to the Bakersfield division.

Emilio G. Collado, assistant treasurer of Standard Oil Co. (N. J.), has been appointed to the staff of senior economists of the Commission on Foreign Economic Policy to serve as consultant on foreign investment.

Leo Shafter Hart, Gilmore, Tex., attorney, has been appointed chairman of the federal petroleum board at Kilgore, Tex., by Interior Secretary Douglas McKay. He succeeds **James Lewis,** who has resigned after being on the board 20 years. He had been board chairman for 8 years.

J. P. Straight has been appointed assistant general superintendent of oil production for Cities Service Oil Co., with

J. P. STRAIGHT

F. D. PRIEBE

headquarters in Bartlesville, Okla. Straight, who has been superintendent of oil production for the Gulf Coast division in Houston, succeeds **Glen R. Harsh,** recently named manager of the oil-production department of Cities Service Petroleum, Inc., New York. **F. D. Priebe,** formerly district superintendent at Odessa, Tex., has replaced Straight. **Don Kastner,** formerly district engineer at Odessa, has become superintendent, and **Max Bolick** has been promoted from assistant production foreman at Odessa to district engineer. **Albert P. Coe, Jr.,** formerly assistant production foreman at Eunice, N. M., has succeeded Bolick. **R. P. Hemphill,** formerly assistant production foreman at Hobbs, N. M., has replaced Coe, and **S. W. Woodruff,** formerly with the natural gas division at Liberal, Kans., has succeeded Hemphill at Hobbs.

Dr. William Robert Marshall, Jr., professor of chemical engineering and associate dean of the College of Engineering at the University of Wisconsin, will receive the eighteenth William H. Walker Award December 15 during the annual meeting of the American Institute of Chemical Engineers in St. Louis. The annual award is for distinguished contribution to chemical engineering literature and is in memory of Walker,

a pioneer in modern chemical engineering and a professor at Massachusetts Institute of Technology.

Lee J. Thronson, formerly manager of production for Mendota Oil Co. in Fort Worth, has joined Oil & Gas Property Management, Inc., in Dallas as manager of drilling and production operations. He was with Sun Oil Co.'s Dallas division from 1938 until 1952, serving as district engineer at McAllen and Corpus Christi and as production superintendent at Premont, Tex.

Mike O'Donnell and **William R. (Bill) Edmondson** have resigned their positions with S. D. Johnson, Wichita Falls, Tex., independent operator, to form a partnership for oil operations in the Rocky Mountain area. Their headquarters are in Denver. Edmondson had been Rocky Mountain manager and O'Donnell lease and contract representative for Johnson in Denver since February. They plan to begin a drilling program in that area before January 1.

S. R. Knapp, tool pusher for Falcon Seaboard Drilling Co., has been transferred from Elk City, Okla., to Lindsay, Okla.

Jack D. Berry has been elected president of Thomas N. Berry & Co., independent producing company with headquarters in Stillwater, Okla. He succeeds **Thomas E. Berry,** president for 12 years, who will remain as vice president.

Herbert C. Thober, chief chemical engineer for Sun Oil Co. in Toledo, has been elected president of the Toledo Society of Chemical Engineers for 1954. Other officers elected include: **Lawrence Larsen,** secretary-treasurer; and **Joseph R. Scalzo,** executive committee. Larsen and Scalzo also are with Sun.

John S. Detweiler, assistant manager of the operations planning division of Standard Oil Co. of California prior to joining the Petroleum Administration for Defense last month as director of the refining and natural-gasoline division, has been named assistant deputy administrator for domestic petroleum operations. He succeeds **Paul E. Kuhl,** who has returned to Esso Standard Oil Co. after service with PAD since last January 6. Kuhl was first deputy director and director of the foreign refining division and later served as director of the refining and natural-gasoline division. **R. Reas Jackson,** who joined PAD last January 5 as director of the refining and natural-gasoline division and more recently served as associate deputy administrator, has returned to Socony-Vacuum Oil Co., Inc.

O. I. Torkelsen, exploration and production coordinator for British American Oil Co., has been appointed to the newly created post of vice president in charge of exploration and production for western Canada, at Calgary, Alta. He also will be responsible for crude-oil purchasing and crude-oil transportation in Canada.

R. M. Cash, general superintendent of the Standard Oil Co. (Ind.) refinery at Sugar Creek, Mo., will become manager of the operations and cost-control division in the manufacturing department general office in Chicago January 1. He will replace **F. Cushing Smith,** who will be transferred to the Whiting, Ind., refinery as general foreman in the light-oils division on special assignment. Other promotions effective January 1 will include: **P. C. Livesay,** manager of the projects, capital expenditures, and miscellaneous contracts division in the manufacturing department general office in Chicago, to succeed Cash as general superintendent of the Sugar Creek refinery; **Charles F. Smith,** assistant general superintendent of the Whiting refinery, to replace Livesay; **Dr. R. N. Giles,** director of technical service in the research department, Chicago, as general superintendent of Standard's newest refinery, now under construction at Mandan, N. D.; **William L. Webb,** administrative director of the Whiting research laboratories, to succeed Dr. Giles; **Dr. C. R. Harte,** superintendent of technical service at Whiting, to the new position of technical service coordinator in the research department, Chicago; **R. F. Baldaste,** assistant administrative director, to succeed Webb; **W. F. Meehan,** assistant superintendent of technical service, to superintendent; **R. C. Mallatt,** chief chemist, to assistant superintendent of technical service; and **Walter V. Cropper,** assistant chief chemist, to chief chemist.

Transportation Club Selects New Officers

New officers and some of the new directors of the Transportation Club of the Petroleum Industry are shown following their election at the club's annual banquet in Chicago recently. Seated (left to right) are: P. J. Bond, Pure Oil Co., Chicago, second vice president; C. F. Dowd, Tide Water Associated Oil Co., New York, first vice president; Lee R. Cowles, Standard Oil Co. (Ind.), Chicago, president; Paul H. Kuhns, Continental Oil Co., Ponca City, Okla., retiring president; and R. R. Hooper, Cities Service Oil Co., New York, reelected secretary. Standing are W. O. Narry, Richfield Oil Corp., Los Angeles; E. J. Schiffer, Gulf Oil Corp., Pittsburgh; P. G. Anderson, Lion Oil Co., El Dorado, Ark.; C. H. Wager, Shell Oil Co., New York; H. I. Moul, Coastal Tank Lines, York, Pa.; and Robert Maquire, Atlantic Refining Co., Philadelphia.

PERSONALS

Pennsylvania Group Names New Officers

New officers of the Middle District Oil Producers Association elected recently at Oil City, Pa., are, left to right: C. F. Kindred, Titusville, chairman of the board of directors and outgoing president; W. A. Hessin, Oil City, president; and Frank E. Lyons, Oil City, secretary-treasurer. John W. Holtz, Pleasantville, not pictured, was elected vice president.

Walter N. Kellogg, petroleum reservoir engineer with Sunray Oil Corp., has been transferred from San Antonio to Tulsa.

James H. Collins, formerly chief of the bulk fuels branch, has been appointed civilian deputy chief of the purchase division of the Armed Services Petroleum Purchasing Agency. **Walter Moorleghen** will succeed Collins as bulk fuel chief, and **Herbert L. Dixson** will take over Moorleghen's post as chief of the packaged products and specialties branch.

Lee R. Cowles, Standard Oil Co. (Ind.), was elected president of the Transportation Club of the Petroleum Industry at its annual meeting held during the American Petroleum Institute's annual convention in Chicago. Other officers include: **C. F. Dowd,** Tide Water Associated Oil Co., New York, first vice president; **Paul J. Bond,** Pure Oil Co., Chicago, second vice president; **Raymond R. Hooper,** Cities Service Oil Co., New York, secretary; and **H. L. McReynolds,** Socony-Vacuum Oil Co., Inc., Kansas City, a director.

Eleven oil men were made honorary members of the board of directors of the American Petroleum Institute at its thirty-third annual meeting in Chicago. This was the first time honorary board members had been designated. Those named, all of whom have retired from the A.P.I. board of directors after 10 years or more of service, are: **H. D. Collier,** Standard Oil Co. of California, San Francisco; **J. Frank Drake,** Gulf Oil Corp., Pittsburgh; **Wirt Franklin,** independent operator, Ardmore, Okla.; **Alexander Fraser,** Shell Oil Co., New York; **H. T. Klein,** The Texas Co., New York; **J. Howard Pew,** Sun Oil Co., Philadelphia; **W. S. S. Rodgers,** The Texas Co., New York; **W. C. Teagle,** Standard Oil Co. (N. J.), New York; **O. D. Donnell,** Ohio Oil Co., Findlay, Ohio; **Robert H. Colley,** Atlantic Refining Co., Philadelphia; and **John R. Suman,** Standard Oil Co. (N. J.), New York.

W. E. Reed, drilling superintendent for Stovall Drilling Co., has been transferred from Texhoma, Okla., to Monroe, La.

E. C. Peet, vice president in charge of finance of Shell Oil Co., has been appointed head of financial administration and a director of Shell Petroleum Co., Ltd., and Anglo-Saxon Petroleum Co., Ltd. Both firms have headquarters in London.

J. D. Walk, technical director of Pan-Am Southern Corp.'s refinery at El Dorado, Ark., has been named manager of technical service in Pan Am's manufacturing department in New Orleans. **O. A. Fuchs,** assistant superintendent of process at the El Dorado refinery, succeeds Walk as technical director. **C. W. Peters,** on leave for the past year with the Petroleum Administration for Defense, will return to Pan-Am as economics director at the Destrehan, La., refinery. **C. M. Durham,** assistant superintendent of utilities at El Dorado, has been promoted to process superintendent. **E. S. Chelchowski,** senior staff engineer at New Orleans, has been appointed assistant process superintendent at El Dorado, and **R. F. Provine,** assistant unit foreman at El Dorado, has been appointed hydroformer unit foreman at El Dorado.

DEATHS

Herbert William Clayton, 55, field gager for General Petroleum Corp., died recently in Bakersfield, Calif.

Robert Courtney Jones, 82, died recently in Cushing, Okla. He was founder of two oil companies and was president of Blackwell Oil & Gas Co. and R. C. Jones Oil Co. Jones also was treasurer of Mul-Berry Co., having stepped down from the presidency last month. He founded Mul-Berry with the late E. C. Mullendore and Thomas N. Berry.

Charley A. Ludey, 79, of Vienna, W. Va., died November 22 at Parkersburg, W. Va. He was active in the early oil development around Tulsa and in 1907 helped organize Link Oil Co. Ludey was treasurer and principal owner of the firm at the time of his death.

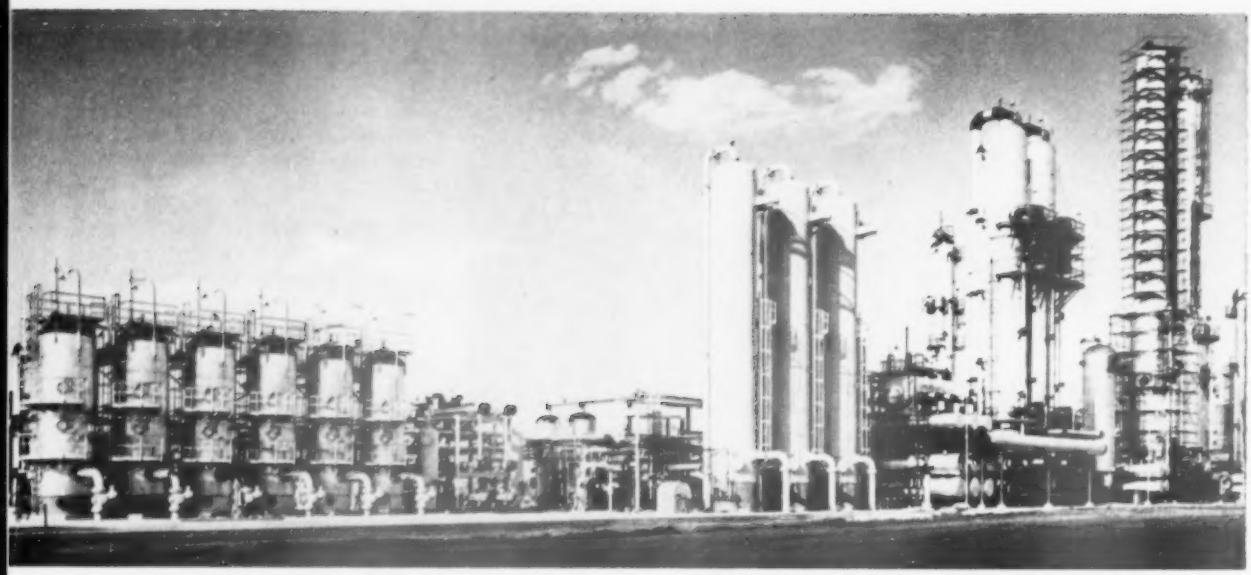
Fred Struhsaker, 49, secretary of the Michigan Conservation Commission, died recently in Lansing. He had been secretary of the commission since July 1951, and previously had served as chief of the lands division since November 1934.

Arnold Plumer Warner, 90-year-old pioneer driller and producer in Pennsylvania, died November 21 at his home in Titusville, Pa.

Dr. Waldorf V. Howard, 58, widely known geologist, died November 24 in Nashville, Tenn. He was a professor of geology at the University of Illinois for 10 years and was a member of the editorial staff of The Oil and Gas Journal from 1940 until 1943.

Walter F. Morgan, 52, superintendent of Lone Star Gas Co.'s plant at Abilene, Tex., died recently in Abilene. He had been with the company about 31 years.

James A. Cure, 66, retired supervisor of the shipping department of Sinclair Refining Co., died in Houston recently.



1 EXTRACTION—Dehydrators, light and heavy-oil absorption towers and heavy-oil stills of the National Petro-Chemicals Corp. extraction unit remove hydrocarbons from 400 million cubic feet of natural gas per day. The new $50 million plant which produces propane, butanes, natural gasoline and industrial chemicals is owned by National Distillers Products and Panhandle Eastern Pipe Line.

PETROCHEM REPORT

Natural Gas to Alcohol

National Petro-Chemical Corp.'s Tuscola, Ill., plant uses 400,000,000 cu. ft. of natural gas to make 125,000 gal. per day of ethanol

The Story of Tuscola . . .

1. National Distillers Products Corp. has been interested in chemicals since the late twenties and in 1933 formed Standard Alcohol Co. with Standard Oil Co. of New Jersey. Since then, it has further exhibited its active interest in the chemical industry by the purchase and exchange of stock of U. S. Industrial Chemical Co. (now a wholly owned division) and the formation of National Distillers Chemical Co.

2. This increased interest led to the petrochemical field. Simultaneously, Panhandle Eastern Pipe Line became interested in petrochemicals so the two companies joined forces and in 1951 formed a new company, National Petro-Chemical Corp. for the express purpose of processing Panhandle Eastern's natural gas to produce petrochemical products.

3. National holds a 60 per cent interest and manages Petro as a subsidiary while Panhandle holds a 40 per cent interest. Panhandle Eastern Pipe Line transports natural gas from Texas, Oklahoma, and Kansas to markets in the Midwest with its terminal at Detroit. At Tuscola, Ill., Panhandle Eastern Pipe Line has a main-line compressor station. At this station, the main line is joined by another major pipe line coming from the Brownsville, Tex., and Louisiana fields. This line is operated by a Panhandle Eastern Pipe Line subsidiary, Trunkline Gas Co. This junction point, along with other favorable considerations, resulted in the selection of Tuscola as the site for a petrochemicals plant.

AT Tuscola, Ill., National Petro-Chemical Corp. operates an extraction-fractionation plant for the production of liquid petroleum gas from 400 million cubic feet per day of Panhandle gas. This was completed and has been in operation since July 1953. The rest of the plant is composed of chemical units; a 325-ton per day ethylene plant produces ethylene for two other plants, an alcohol unit and an ethyl chloride unit. The first two chemical units are currently being started up and production is expected from the ethyl chloride plant in December 1953.

Compressor station . . . The Panhandle Eastern Pipe Line compressor station at Tuscola is typical of other main-line compressor stations spaced at intervals of approximately 70 miles. It has 14 gas-driven reciprocating compressors with a total horsepower of 19,600,

ranging in size from 600 hp. for the older machines to 2,000 hp. for the newest compressors which were installed in 1952.

The Tuscola station is self-sufficient. It generates its required electrical power and has complete facilities for water treatment. The cooling facilities for engine jacket water and compressed gas consist of two natural-draft cooling towers and six fin-fan cooling units.

Hydrocarbon Recovery

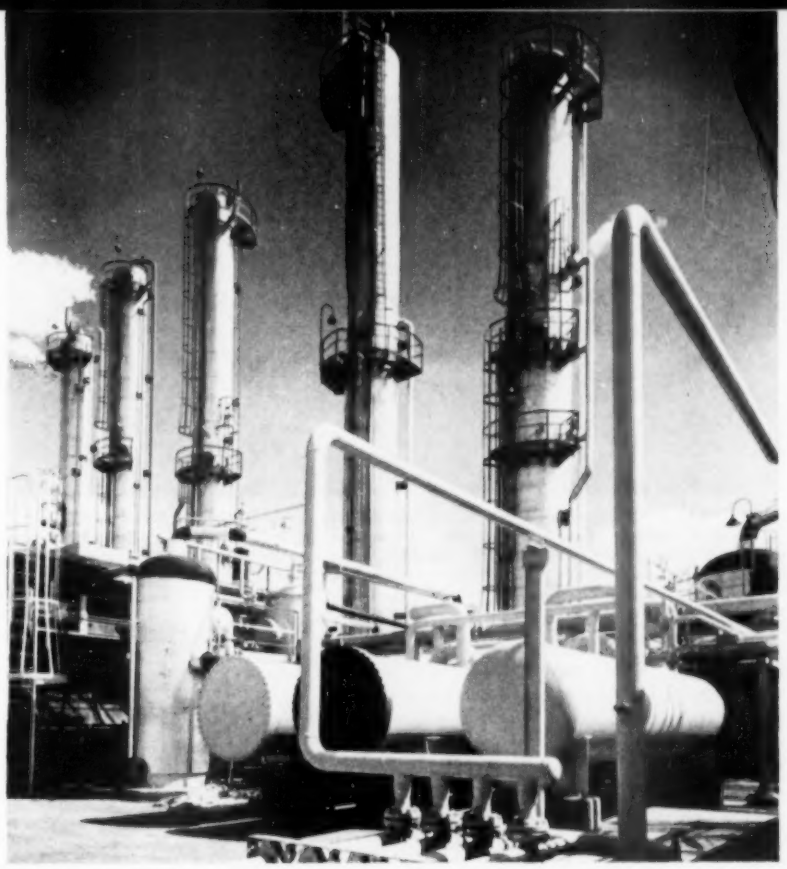
Natural gas from Panhandle Eastern Pipe Line is delivered to an extraction plant which is designed to process a normal maximum of 400 million cubic feet of natural gas per day and a peak of 425 million cubic feet per day. From this stream, 10 M.M.s.c.f. of ethane (or approximately 40 per cent of the ethane content) is extracted daily for the production of ethylene. In addition, essentially all the propane, isobutane, normal butane, and natural gasoline are removed from the natural-gas stream.

Dehydration . . . The natural gas, delivered from the Panhandle Eastern Pipe Line system, is first dehydrated to a —40° F. dew point to prevent freezing in the low-temperature process equipment. Approximately 7 lb. of water is removed from each million cubic feet of gas in the dehydrators. Each dehydrator, containing a 9½-ft. bed of Sovabead packed between two 3-ft. beds of desiccant, is operated for 12 hours followed by a 3-hour regeneration and a 3-hour cooling period.

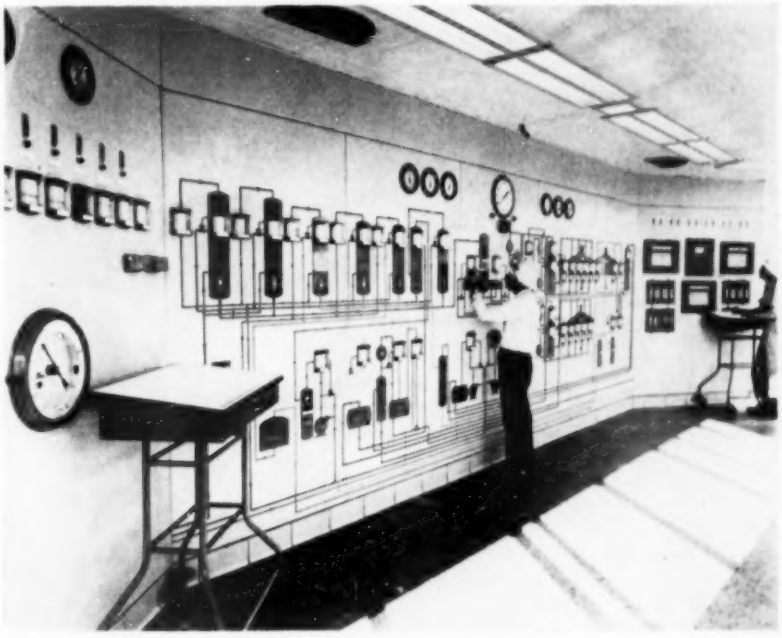
Light-oil absorbers . . . The dehydrated gas is then cooled by exchange with the light-oil absorber outlet gas and with propane refrigeration to a temperature of —20° F. before entering the light-oil absorbers. A —20° F. hexane cut is used as the absorbing medium at a rate of about 1,700 g.p.m. The lean absorption oil as well as the gas stream splits before entering two light-oil absorbers operating in parallel. The heat of absorption is removed by two sets of intercoolers which are chilled by propane refrigeration. The average operating temperature of the absorbers is about —10° F.

Heavy-oil absorbers . . . Gas leaving the light-oil absorbers enter three heavy-oil absorbers operating in parallel where the light oil present in the gas is recovered by absorption at a pressure of 480 psig. and a temperature of 60° F. The heavy absorption oil is charged to each absorber at a rate of about 180 g.p.m. and at a temperature of about 50° F. The stripped gas leaving the heavy-oil absorbers is returned to the Panhandle Eastern Pipe Line compressor station. This gas is blended with Trunkline gas to maintain a B.t.u. content of 975 per cubic foot, the minimum required for industrial sales.

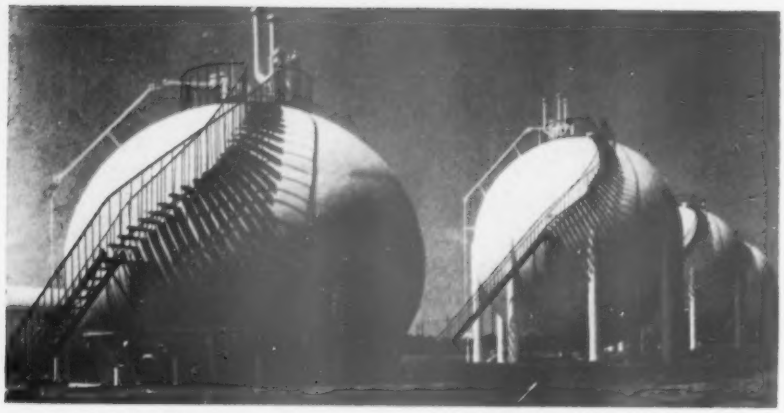
Rich oil leaving the heavy-oil ab-



2 FRACTIONATION—These fractionating towers at the National Petro-Chemicals Tuscola, Ill., plant are part of a seven-unit complex, including two integrated plants of National Distillers Products Corp.



3 CONTROL—This is the control board for the hydrocarbons extraction unit. Similar graphic panels monitor other units at the Tuscola plant.



4 STORAGE—Hortonspheres for storing butanes and natural gasoline at Tuscola, Ill. Almost 9 million gallons of liquid hydrocarbons can be stored in the National Petro tank farm and underground storage caverns. In addition to hydrocarbons, synthetic alcohol, ethyl chloride, ammonia, sulfuric acid and ether are products of the new plant.

sorbers is charged to the heavy-oil still where the light and heavy oils are separated. Heat is supplied by a direct-fired reboiler with a duty of 50,000,000 B.t.u. per hour.

Demethanizer . . . Rich oil from the light-oil absorber is charged to a demethanizer operating at about 405 psig. where the absorbed methane is removed from the rich light oil. This methane stream passes through a reabsorber and preabsorber for marginal recovery of ethane prior to its return to the stripped-gas stream.

The rich oil from the demethanizer is then charged to two light-oil stills operating in parallel where the extracted L.P.G. is separated from the light oil. The L.P.G. is condensed by water cooling and then sent to the fractionation unit for separation. Each light-oil still utilizes a direct-fired reboiler with a duty of 31,000,000 B.t.u. per hour.

Propane refrigeration is supplied by two 4,000-hp. steam-turbine-driven centrifugal compressors operating at 6,750 r.p.m. Propane at various saturation temperatures and pressures is vaporized into five separate stages of the compressor to provide refrigeration at —30°, —20°, 27°, 48°, and 70° F.

Fractionation . . . The L.P.G. stream from the extraction unit, consisting primarily of ethane and propane with lesser amounts of iso and normal butane and natural gasoline, is charged to the fractionation unit for separation in a series of four towers.

A 95 per cent pure ethane stream is removed from the L.P.G. in a 26-tray deethanizer operating at 485 psig. Part of the overhead is condensed by propane refrigeration for reflux purposes and the remainder is sent to the ethylene plant as a vapor. The bottoms from the deethanizer are pressured to a 40-tray depropanizer operating at 205 psig. The propane is removed as a 96 per cent pure product and sent to storage.

The bottoms from the depropanizer are pressured into the debutanizer where the iso and normal butane are separated from the natural gasoline. The natural gasoline from the debutanizer is sent to storage and the butane fraction to the 70-tray deisobutanizer where the isobutane with a minimum purity of 95 per cent is separated from the normal butane.

All the fractionating towers are equipped with kettle-type reboilers heated with 65-psig. steam. With the exception of the deethanizer tower, all the overhead condensers are cooled with 85° F. water recirculated through cooling towers.

Loading . . . A 40-spot tank-car loading rack was designed so that 1 day's production of products can be loaded at all positions; isobutane at five, normal butane at eight, and natural gasoline at five.

Three truck-loading racks operate 24 hours a day and are equipped so propane can be loaded at six positions, and each of the other products at three positions. Odorizing equipment is provided at all tank-car and truck loading positions.

Capacity . . . The daily production and storage capacities for the products are as follows:

Product—	Production per day	Storage capacity
Ethane, cu. ft.	10,000,000	
Propane, gal.	350,000	8,100,000
Isobutane, gal.	30,000	250,000
Normal butane, gal.	55,000	500,000
Gasoline, gal.	10,000	145,000

Ethylene Unit

Ethane from the fractionation plant is received at the ethylene plant for purification, cracking, and ethylene recovery. The ethane is first scrubbed with caustic to remove minor quantities of sulfur compounds.

Ethylene manufacture . . . Conversion of the purified ethane to ethylene is accomplished at elevated temperatures in a bank of eight furnaces. The pressure in the reaction zone is approxi-

5 LOADING—Tank cars wait at sidings for their turn at loading racks. About 1,100 tank cars are required at National Petro-Chemicals Tuscola plant.

mately atmospheric and residence time is relatively short.

The furnace or heater effluent, containing between 20 and 30 per cent ethylene, is shock quenched by a water spray and is further cooled by the cooling-water system. A waste-heat steam boiler has been built into the convection section of the furnace for recovery of heat from the flue gases. The cooled quench spray carries with it a large proportion of the tars, heavy polymers, and coke. These materials are removed from the water in a surge drum prior to the reuse of the water.

Ethylene purification . . . The hydrocarbons from the quench drums are stripped of all compounds heavier than pentane in a light-oil absorption tower. The rich oil is steam stripped for reuse. The scrubbed gases from the absorber are compressed stepwise with cooling between each pressure stage.

Final utilization of the ethylene from this plant prohibits acetylene in the end product. Therefore, practically all acetylene is converted to ethylene by catalytic hydrogenation. This hydrogenation is carried out at moderate pressures and at slightly elevated temperatures. The catalyst for the acetylene conversion requires occasional regeneration and reactivation.

The wet gas from the converters is further compressed with interstage cooling and subsequent water knockout and dried with trays of activated aluminum oxide. Regeneration of the drier trays is carried out with heated gas from the cracking heaters.

The exit gas from the driers is cooled by propane refrigeration and charged into a refrigerated absorption tower for the removal of methane and hydrogen from the mixture of ethylene and higher-molecular-weight hydrocarbons.

Hydrogen removal . . . The absorber overhead of hydrogen and methane contains a small amount of higher-molecular-weight compounds including some lean oil. These compounds are removed in two ways. A portion is refrigerated to extremely low temperatures until all hydrocarbons have been condensed leaving an essentially pure hydrogen which is sent to ethyl chloride plant for further processing. Starting in late 1954 the remainder of the hydrogen will be purified and used for ammonia production. The light oil is returned to the absorber feed and other lighter hydrocarbons enter the plant fuel system. The main portion of the overhead gas is cooled by expanding through a turbogenerator where a portion of the energy of compression is regained. Most of the light oil is recovered as condensate after the expansion. The remaining gas is utilized as fuel in the cracking furnaces.

The ethane and ethylene are removed from the rich absorber oil in a deethanizer leaving a lean oil which is contaminated with some higher olefins. This oil is rerun in a still column and the light oil returned to the lean-oil reservoir.

The final tower in the ethylene plant fractionates the ethylene from the ethane present in the deethanizer overhead. Reflux is obtained by refrigeration and compression. The overhead product consists of an ethylene with a minimum purity of 95 per cent.

Propane refrigeration is used throughout the entire unit and two temperature levels are maintained; one at —15° F. and the other at 40° F. The refrigeration system uses two 4,400-hp. centrifugal compressors.

Ethyl Alcohol Plant

Ethyl alcohol is produced from ethylene by the sulfuric acid process. Ethylene is absorbed in strong sulfuric acid to form ethyl sulfate; the ethyl sulfate is hydrolyzed with water to form alcohol which is steam stripped from the acid. The acid is reconcentrated under vacuum and fortified for reuse in the process. The crude alcohol is refined by distillation to produce the final products of 190-proof ethyl alcohol and diethyl ether.

Ethylene-sulfuric contacting . . . Approximately 7,700,000 cu. ft. per day of ethylene is supplied to the ethanol synthesis unit by the ethylene plant. This ethylene is contacted with strong sulfuric acid in two liquidful, absorption towers; the absorption is carried on at elevated temperatures and pressures in order to complete the reaction of a reasonable reactor volume. The diluent gases in the feed along with a small stream of unabsorbed ethylene are vented from the absorbers and returned to the ethylene plant. The ethylene-sulfuric acid "absorbate" is discharged from the absorbers and sent out to intermediate storage.

Hydrolysis . . . This step is carried out in a corrosion-resistant reactor, forming ethyl alcohol and diethyl ether. In a conventional-type distillation column, open steam is used to strip ethyl alcohol and ether from the weak sulfuric acid that was released by the hydrolysis of ethyl sulfate. Crude alcohol is neutralized with caustic and sent to storage. Spent acid from the stripper bottoms is pumped to storage before feeding to the acid concentrator.

Extractive distillation . . . The crude alcohol is refined in a series of distillation columns, first to remove ethyl ether, second to remove impurities boiling in the same range as alcohol, and third to refine the alcohol. The removal of impurities is by extractive distillation, which involves stripping of the impurities from a dilute solution of alcohol under conditions where the relative volatilities are reversed. A batch still is available for occasional recovery of ether of special grades, and also for recovery of alcohol and other components of the impurity stream.

Conserve heat . . . The heat requirements of this purification system, with its large quantities of dilution water to be removed by distillation, was of prime importance in the design. To conserve heat, the columns employ a vapor-reuse system. Open steam is supplied to the bottom of the rectifier. The overhead vapors are used to supply heat to the reboilers of the ether and extractive distillation columns. Reboiler condensate is then returned to the rectifier reflux drum. The rectifier is operated under pressure in order to obtain a satisfactory temperature difference in the reboilers.

Acid concentrators . . . These are conventional vacuum units which raise the concentration of the weak acid to 92 weight per cent sulfuric acid. There are six concentrators, operating at 4.0 to 0.4 in. Hg and using 65, 150, and 300-psig. steam in bayonet heaters to supply the necessary heat. The concentrated acid is pumped to the U. S. Industrial Chemical sulfuric acid plant where it is fortified to full strength and returned to the alcohol unit. A portion of the acid is also removed from the concentrators at 77 per cent acid strength and delivered to U. S. Industrial Chemicals for external sale, mostly for production of superphosphate.

Construction materials . . . The variety of chemicals handled in the alcohol unit has resulted in a very wide range of construction materials. In cold concentrated acid and absorbate services, steel is used; for the same chemicals at elevated temperatures, Hastelloy, Carpenter 20, Durimet 20, etc., are used. The hydrolyzer and stripper are steel, lead and carbon-brick lined with carbon trays and bubble caps to withstand hot, dilute sulfuric acid; Karbate pumps, with lead and carbon-lined piping are used to transport these materials.

Weak-acid storage tanks are steel, lined with tygon sheet and acid brick. The acid concentrators are steel lined

with sheet lead and then acid brick. Tantalum and Hastelloy are used in the heating tubes, and Hastelloy, lead and carbon-lined valves and piping for the acid streams. The finishing section is primarily copper and copper-lined columns and the lines with cast iron, bronze fitted pumps.

Alcohol capacity . . . The finished products from this unit are 190-proof alcohol and diethyl ether. The 125,000 gal. per day of alcohol represents about 30 per cent of the nation's output of synthetic ethanol. The byproduct ether production is 9,500 gal. per day.

Ethyl Chloride

In addition to supplying 7,700,000 cu. ft. per day of ethylene for the ethanol synthesis plant, the ethylene plant supplies approximately 1,000,000 cu. ft. per day of ethylene and 500,000 cu. ft. per day of byproduct hydrogen for the ethyl chloride plant.

In addition to hydrogen and ethylene, chlorine is the other basic ingredient used in the plant. Chlorine is shipped in by tank car at the rate of a car a day. Chlorine storage facilities have been provided so that the plant may operate for approximately a week without further shipments. The plant includes a unit for burning chlorine with byproduct hydrogen from the ethylene plant. This combustion is performed in Karbate furnaces. The products are recovered by absorption in muriatic acid and the hydrogen chloride is subsequently stripped prior to compression for the synthesis operation. This part of the plant is unique in that the materials of construction are a combination of Karbate and Haveg.

Making ethyl chloride . . . The ethyl chloride process combines hydrogen chloride and ethylene gases directly to produce ethyl chloride. Approximately 50,000,000 lb. per year is to be produced. The reaction vessels and compression equipment which are the heart of the process are followed by rectifying columns for producing pure anhydrous ethyl chloride.

The ethyl chloride produced will be suitable for tetraethyl lead manufacture and other processes requiring a high-purity ethyl chloride. Shipments will be made from the plant mainly by tank car.

Utilities

The large quantities of electric power and process steam required for the operation of the equipment in the several processing areas of the N.P.C.C. plant at Tuscola, necessitated a careful study of all available sources of those commodities.

For steam there was no alternative. The remoteness of the plant site from a commercial source of steam of any kind dictated the obvious solution: the erection of a boiler plant at the site of sufficient size to supply the necessary steam at required temperatures and pressures.

Electric power supply presented some element of choice between two possibilities: the purchase of all power requirements from established electric utilities in the immediate area; or expansion of the "boiler" plant into a "power" plant by the addition of turbines, generators, condensers, etc., plus sufficient additional boiler capacity to produce the electric power.

For the first units the latter alternative was selected. However, the steam balance makes it more economical to purchase power for the new polyethylene and ammonia units.

Extraction turbine . . . The decision to construct a turbine power plant has other advantages. Since process steam is used at two pressures; 600 and 65 psi., the latter pressure steam balance is maintained by "bleeding" or "extracting" from an appropriate interstage point on the turbine and held at a constant pressure by an extraction pressure regulator. Thus, the higher pressure portion of the turbine blading acts as a pressure reducing valve dropping the pressure from 600 psi. to 65 psi. more effectively and efficiently (some power is produced by the extracted steam before it leaves the turbine casing) than the conventional reducing valve.

Using 65-psi. steam . . . This feature quite ingeniously also works in "reverse." Frequently, under startup conditions and occasionally during local disturbances when the entire processing area is on steam, 65-psi. steam from certain parts of the process areas may exceed their own requirements. Under these conditions the steam is "inducted," and expands through the low-pressure stages of the turbine to be exhausted under vacuum into the condenser. During the passage through the turbine an appropriate amount of electric energy is produced. Without this arrangement, the surplus 65-psi. steam would be vented to atmosphere through relief valves with an attendant loss of its stored heat energy.

The power house . . . This contains three two-drum water-cooled nonslagging furnace boilers. These boilers are equipped to burn coal, natural gas, or a combination of both including propane and butane. When operating on coal and natural gas, they have capacities of 200,000 lb. of steam per hour and 265,000 lb. of steam per hour, respectively. For continuity of operation they are fed by two 620-g.p.m. boiler-feed pumps, one driven by an electric motor and the other by a steam turbine.

Problems Licked in Startup of Hydrocarbon-Recovery Unit

by J. F. McDonald

BEFORE the recovery units could be started, it was necessary to select and train personnel as operators. This proved to be a large undertaking since our plant is located in the center of the fertile Illinois corn belt and remote from any industrial areas. The lack of housing facilities in the area also made it desirable to hire as many local residents as possible.

To find suitable applicants, limited advertisements were placed in the Chicago and St. Louis newspapers, and in certain trade journals. However, for the most part, advertising was restricted to the nearby towns of Tuscola, Decatur, and Champaign.

Author is superintendent of hydrocarbon recovery, National Petro-Chemicals Corp., Tuscola, Ill.

Hiring and Training Program

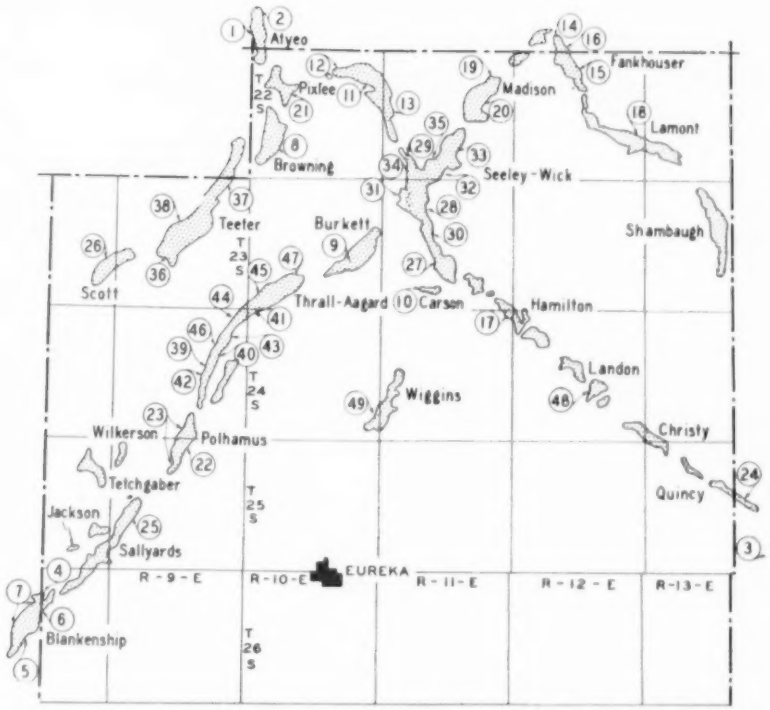
As a result of this, 1,400 applicants were interviewed from whom 100 were hired as operating personnel. Out of this total, 40 were for the hydrocarbon-recovery section. Eighty per cent of these new employes lived within a radius of 30 miles of the plant site and had no previous experience in either L.P.G. or petrochemical manufacture. This made it necessary to develop a very detailed training course to prepare the new employes for actual plant operation.

(Continued on page 75)

This settling pond on Phillips' DeMalorie-Sowder unit provides a 3-day retention for an anticipated 20,000 bbl. per day.

Aeration in this pit precedes lime treatment of injection water for flooding on Ohio Oil's John Atyeo Communitization.

WATER FLOODING'S SHOWPIECE . . .



Greenwood County, Kansas, with its presently active water floods. Numbers on this map are keyed to tabulation of the floods included in this article.

. . . "The Golden Lane"

A bonus of a hundred million barrels of oil is expected as a result of these ventures, over what had been possible with primary-recovery methods.

by Ed McGhee
District Editor, Drilling and Production

GREENWOOD COUNTY, Kansas, long regarded as the Mid-Continent's most successful water-flooding area, has more than 50 presently active floods. The Bartlesville sand stringers that gave it the name "The Golden Lane," still yield in excess of 16,000 bbl. of oil per day to these projects.

To date, the average water-flood recovery slightly exceeds 3,100 bbl. per acre and several projects have produced more than 6,000 bbl. per acre. If the 20,000 potential secondary-recovery acres yield an ultimate 5,000 bbl. of oil per acre, as is estimated, a total of 100,000,000 bbl. will have been recovered over what has been possible with primary-recovery methods.

Shoestring sands . . . These Bartlesville shoestring sands occur in four trends of lenses deposited in the Cherokee shale of Pennsylvanian age. After first production was obtained in 1917, development continued rapidly until the middle 1920's.

First indication that water flood might be successful was given the operators by "accidental floods" that resulted from improper shutoff of overlying zones in plugged wells.

The year 1935 marked the first secondary-recovery attempts in the area. The first authorized water flood, which started that year, is still in progress and is presently operated by Phillips Petroleum Co.

Gas repressuring, which was initiated

Water-Flood Data on the 53 Water-Flood Projects in

Name of flood—	Operator	Producing acres: Developed	Producing acres: Total	Depth (ft.)	Acre spacing	Net ft. of sand	Core data: Perm. (md.)	Core data: Porosity (%)	First injection
ATYEO POOL:									
1. Atyeo	Ohio	280	280	2,188	8.8	35	54.5	19.2	7-47
1a. Atyeo	Cities Service	127	127	2,460	10	26	49	18	2-52
2. Jones	Barbara	30	80	2,300	10	30	30	19	4-48
BATESVILLE POOL:									
3. Batesville	Bird-Sheedy	(No information available)							
BLANKENSHIP POOL:									
4. Lillystrand	Branine-Goering	(No information available)							
5. Sallyards	Tide Water	350	450	2,500	10	30	40	20	1-49
6. Hughes	Franco-Central	80	80	2,500	15	84	67	19	9-51
7. Sallyards	Sohio	145	185	2,525	10	45	46.5	18.4	5-49
BROWNING POOL:									
8. Browning	Sinclair	180	1,000	2,300	10	51	48	20	11-49
BURKETT POOL:									
9. Burkett	Phillips	665	685	2,118	10	38	7	16	9-41
CARSON POOL:									
10. Carson	McGinnis	None	200	1,985	(Flood being developed)				
DeMALORIE-SOWDERS POOL:									
11. DeMalorie-Sowders	Phillips	398	636	2,120	20	45	7.1	15.2	4-49
12. Pix	Phillips	25	25	2,194	20	54	N.R.	N.R.	4-49
13. J. D. Clopton	Mid-Continent	160	160	2,100	10	25	50	20	12-46
FANKHAUSER POOL:									
14. Fankhauser-A	Cities Service	70	70	1,850	10 & 20	26	106	20	6-50
15. Fankhauser	Sunray								
16. Lauck & McIlvain	Phillips	100	100	1,920	20	40	79.6	20	1-43
HAMILTON POOL:									
17. Patterson	Cities Service	200	200	1,850	10	45	30	17.7	9-46
LAMONT POOL:									
18. Lamont	Cities Service	800	800	1,700	10 & 20	37	57	20	5-49
MADISON POOL:									
19. Kipfer-McGilvray	Magnolia	65	65	1,800	20	25	N.R.	N.R.	9-49
20. Madison	Cities Service	585	985	1,875	20	29	30	17.5	10-48
PIXLEE POOL:									
21. Browning-Pixlee	Barbara	100	200	2,250	10	25	1,000	19	6-47
22. Polhamus	Glenwood	275	275	2,300	10	35	15	20	4-49
23. Polhamus	Sohio	195	195	2,200	10	35	14	20	5-49
QUINCY POOL:									
24. Quincy									
SALLYARDS POOL:	Ohio	205	205	2,402	Irregular	51	29	18.9	3-46
25. Sallyards									
25a. Hoffman	Ohio	55	55	2,454	Irregular	40	26	17.7	8-51
25b. Ladd "A"	Ohio	79	79	2,407	Irregular	36	29	18.9	8-51
SCOTT POOL:									
26. Scott	Phillips	200	427	2,605	20	35	85	20	10-45
SEELEY-WICK POOL:									
27. Beal	Phillips	354	580	1,963	10	79	8.4	16.2	7-50
28. Clopton	Cities Service	250	250	1,950	10	36	21	17	3-46
29. Cragan	Cities Service								
29a. Greenwood	Cities Service	66	66	2,050	10 & 20	30	30	16	1-52
30. McGilvray	Phillips	190	298	1,994	20	37	6.7	16.9	12-48
31. Seeley	Magnolia	555	555	1,975	10	32	27	18	1-43
32. Seeley-Wick	Phillips	253	253	1,960	13	30	12	18	12-43
33. Wick	Skelly	600	600	1,950	20	27	20	18.9	8-47
33a. Freeburg	Pay Rock	50	90	1,950	10	31	23	17.5	3-53
34. York-DeMalorie and O'Neal	Phillips	286.4	286.4	1,997	10	47	28.7	17.4	3-37
35. York-Wescott	Phillips	93.8	93.8	1,984	12.8	29	N.R.	N.R.	11-43
TETER POOL:									
36. Morris-McGinnis									
37. Shambaugh									
38. Teter	Cities Service	985	1,160	2,550	20	37	30	17	11-47
THRALL-AAGARD POOL:									
39. Aagard	Phillips	47.5	47.5	2,150	6.4	40	16	17	7-37
40. Bratton									
41. Cartwright	Phillips	129	161	2,350	15	35	14	18.8	3-52
42. Gard	Phillips	110	110	2,170	13	39	10	16	12-36
43. Lewis and Cannon	Phillips	80	80	2,310	12.8	48	10	16	4-45
44. E. Marshall	Arkansas Fuel	84	84	2,335	7.6	37	41	20.2	12-44
45. Martindell-Teter	Ohio	366	366	2,296	10	61	13	16.5	5-48
46. Olson-Anderson	Ohio	78	98	2,170	Irregular	53	17	17.8	4-44
47. Thrall-McKee	Sinclair	644	721	2,300	Irregular	31	39	18	6-49
VIRGIL POOL:									
48. Johnson									
WIGGINS POOL:									
49. Wiggins	McGinnis		530	1,864	10	(Flood being developed)			
Total		10,592	13,465			*39.2			

*Averages.

Kansas' "Golden Lane" Pools (Greenwood County)

No. of wells			Type injection	Water supply		Daily water	Bbl. water	Water-flood recovery		Primary recovery	Surface injection	Present daily production	
Oil	Input	Supply	wells	Source	Treatment	input	injected	Barrels	B/A	B/A	pressure	Oil	Water
37	25	1	21D-4C	Arbuckle	Lime	5,134	7,464,194	1,219,257	4,354	5,600	800	376	4,363
17	15	1	D	Arbuckle	Tret-Rite	2,029	806,101	187,455	1,470	7,800	285	553	879
6	3	1	D	Arbuckle	Lime	1,000	1,323,244	88,671	2,540	3,625	530	41	600
46	43	1	D & C	Arbuckle	Lime	7,000	4,524,000	875,000	2,500	N.R.	200	800	4,000
17	12	2	D	Douglas	Kontol	2,760	1,240,963	80,377	1,000	8,000	N.R.	140	1,000
17	20	1	D	Arbuckle	Lime	3,500	2,179,398	398,650	2,810	6,000	300	500	1,300
72	18	6	4D-14C	Douglas and River	Filtering	4,500	3,606,405	46,530	47	N.R.	225	271	622
86	66	5	D	Douglas	Formaldehyde	10,731	33,171,936	4,703,324	7,070	4,600	880	590	8,841
47	24	1	C	Arbuckle	Lime	5,792	3,512,124	225,804	949	7,680	950	420	261
3	2		C	Arbuckle	Lime	131	655,597	62,696	2,508	9,220	950	33	91
9	7	2	C	Douglas	Dearborn	595	743,402	123,206	770	2,095	475	119	512
5	3	0	D & C	Douglas	Kontol	937	782,162	276,783	3,950	5,350	558	38	845
7	6	1	1D-5C	Douglas	Bianol	1,516	2,956,422	251,029	2,510	3,110	300	49	1,299
29	20	6	D	Douglas	Lime	3,622	9,814,084	1,264,340	9,230	6,679	750	164	2,367
59	46	4	D & C	Douglas	Lime	8,409	8,996,558	615,292	770	6,298	360	663	5,648
6	6	1	C	Douglas	None	1,520	1,481,000	258,700	3,980	N.R.	450	380	720
57	37	1	C	Arbuckle	Tret-Rite	8,812	8,232,019	387,196	695	5,462	560	853	3,633
17	11	2	D	Douglas	Dearborn	2,000	5,783,874	173,435	1,735	4,300	460	46	1,000
29	22	3	D	Douglas	Dearborn	5,000	5,000,000	N.R.	N.R.	N.R.	870	N.R.	N.R.
29	30	3	D	Douglas	None	4,000	4,587,274	737,224	3,770	6,800	500	430	4,000
28	21	4	D	Douglas	Lime	3,252	11,215,303	938,133	4,576	4,743	1,040	127	2,493
9	6	0	D	Douglas	Lime	574	501,230	74,202	1,349	3,807	1,040	130	238
8	4	0	C	Douglas	Lime	726	535,604	59,381	752	3,641	1,040	174	433
42	12	3	C	Douglas	Formaldehyde	4,914	8,272,043	345,447	1,727	8,104	250	484	3,073
55	37	1	D	Arbuckle	Lime	18,877	7,401,452	1,232,499	3,482	7,700	840	3,632	5,541
25	21	3	D	Douglas	None	3,938	8,572,806	720,493	3,690	4,722	900	169	3,159
6	6	1	3D-3C	Douglas	None	917	445,004	21,953	333	3,650	900	80	132
31	9	2	C	Douglas	Bianol "A"	3,490	2,339,738	213,604	1,124	4,210	900	294	862
62	60	11	D	Douglas	None	12,670	28,766,000	3,501,000	6,300	6,000	630	356	11,770
25	19	2	1D-18C	Douglas	Formaldehyde	2,515	7,585,904	522,064	2,064	2,842	450	80	927
37	18	4	2D-16C	Douglas	Caustic soda	3,173	5,531,008	494,290	824	3,442	550	483	2,893
3	1	1	D	Douglas	Formaldehyde	175	10,329	2,909	32	N.R.	425	32	2
34	31	1	D	Douglas	Lime	6,197	19,915,788	1,021,155	7,064	5,779	400	294	4,874
10	10	1	5D-5C	Douglas	Formaldehyde	1,730	2,689,708	202,263	2,156	2,960	500	53	879
45	32	1	C	Arbuckle	Tret-Rite	7,536	6,138,493	276,782	892	6,291	580	293	1,497
4	1	1	C	Douglas	Formaldehyde	499	2,650,523	369,250	7,774	4,720	500	23	80
16	13	1	C	Arbuckle	Lime	2,389	1,996,158	192,342	1,491	5,835	900	401	1,639
16	10	1	2D-8C	Douglas	Formaldehyde	1,963	6,899,868	902,432	8,204	4,190	900	69	1,102
11	9	1	2D-7C	Douglas	Formaldehyde	1,479	4,993,147	559,448	6,980	7,850	620	59	796
11	5	1	C	Douglas	None	1,150	2,195,096	368,138	4,382	6,370	280 & 660	123	643
45	35	2	32D-3C	Arbuckle	Lime	6,161	8,374,948	1,339,917	3,661	6,135	800	583	4,933
12	6	1	D	Douglas	Lime	1,827	5,928,413	639,944	6,530	4,350	1,600	60	1,061
80	62	8	N.R.	Douglas	Lime	13,649	15,774,818	2,082,164	2,888	8,700	450	1,300	11,500
						178,789	265,594,138	28,054,779	*3,117	*5,486	*627	15,765	101,646

New development by Phillips made necessary the drilling of this water-supply well, now producing with a 135-hp. pump.

Electrically driven pumping unit on an Ohio Oil Co. well. Water supply and injection system are also electrified.

the same year, was found to be generally successful but has been mostly discontinued in favor of water flooding.

Good water available . . . The Tonganoxie sand in the Douglas group, commonly known as the Douglas sand, lies at depths of 800 to 1,200 ft. throughout most of Greenwood County and furnishes injection water for many of the floods. A "closed" water system is generally possible with Douglas water.

Local variations and depletion of the Douglas has necessitated the use of Arbuckle lime water and surface water in some projects. "Open" water systems are usually required in these cases.

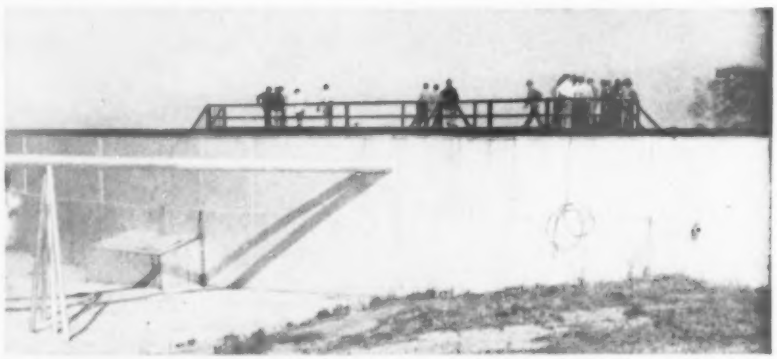
It is estimated that 266,000,000 bbl. of water has been injected into the Bartlesville sand in Greenwood County, and this has resulted in the production of 27,000,000 bbl. of additional oil. Total oil production for the county since original production in 1905 has reached more than 205,000,000 bbl.

Early Repressuring Project Now Being Flooded

Phillips Petroleum Co.'s DeMalorie-Sowder unit was the location of one of the first gas-repressuring projects in the county, injection having started on a portion of the tract in 1935. After unitization in 1937, gas repressuring was extended to include all of the 636 potential acres on the unit and some additional acreage on adjoining leases.

Repressuring recovered an estimated additional 1,749,000 bbl. of oil, or about 2,751 bbl. per acre. A portion of this repressuring operation is still active and will continue until water-flood development is complete.

At present, 398 acres of the unit are being flooded, and expansion now in progress will place 238 more acres



Produced water and Douglas sand water are mixed and filtered through this slow sand filter on Sinclair's Browning unit. All photographs taken during the annual tour of the water-flood area, October 7, 1953.

under flood to complete development of all potential acreage. A 20-acre spacing has been used for like wells.

Low permeability . . . Average permeability of the Bartlesville sand on the DeMalorie-Sowder unit, core data indicate, is 7 md., and porosity averages 15.2 per cent. Usual depth of the sand in this area is 2,120 ft.

Primary development took place from 1924 to 1926, with production from the 770 primary acres amounting to 5,915,000 bbl. gross. This means 7,680 bbl. was recovered per acre through the solution-gas mechanism.

Initial water flooding on the unit began in April 1949, with the relatively low injection rate of 446 bbl. of water per day into three input wells on the west portion of the unit. Therefore, stimulus was not realized until July 1950, when production increased from 288 to 297 bbl. of oil per day.

Water-flood development continued slowly until early 1952 when water was being injected into 8 wells on 132 developed acres. An intensive program during 1952 proceeded eastward and added 16 input wells to raise the total developed acreage to 398. Stimulus from this development is not yet felt.

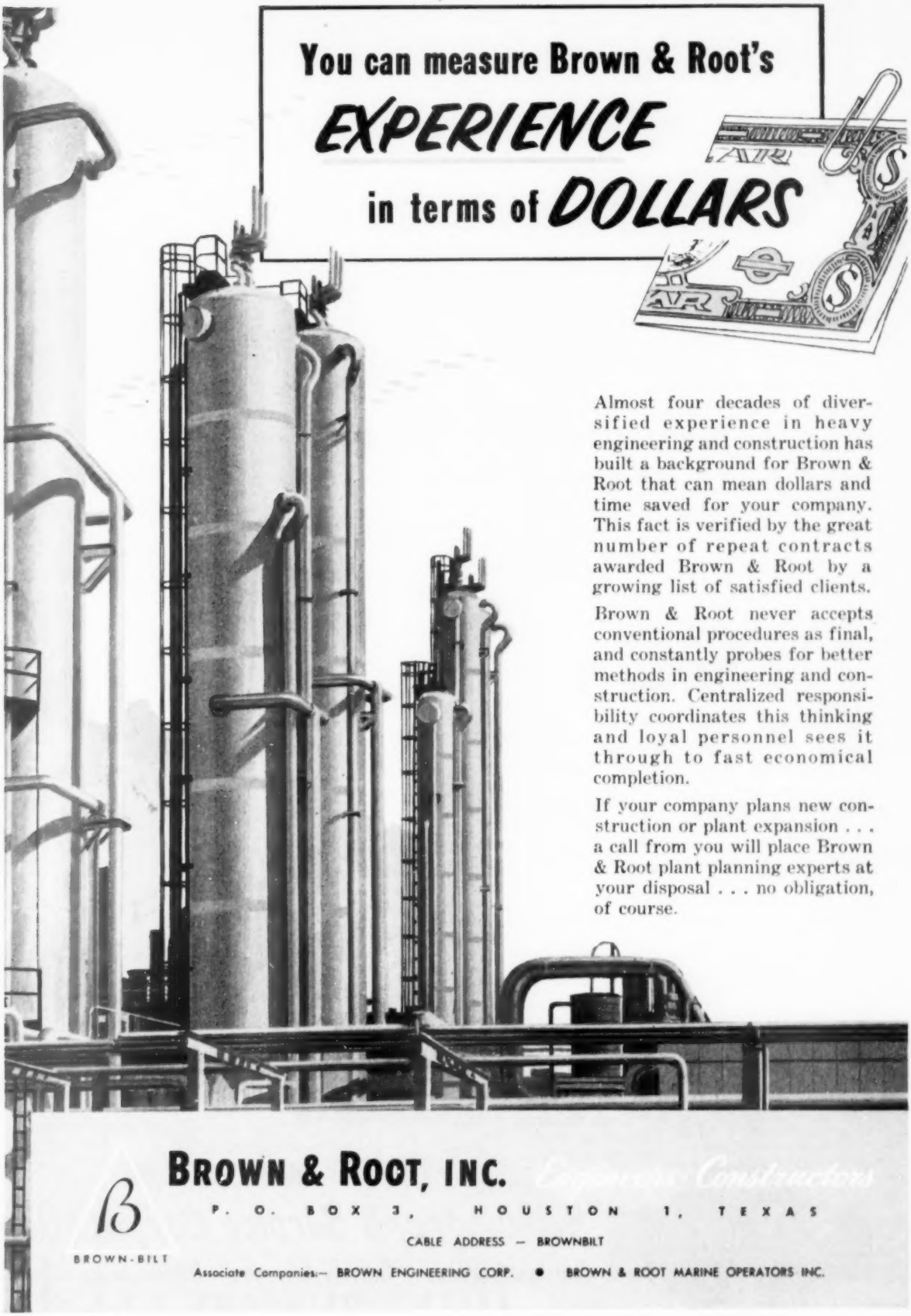
Additional projects this year will add 15 more input wells and complete water-flood development of the entire 636 secondary acres.

Former gas-input wells used . . . Wherever possible, former gas input wells have been used as water inputs, but primary emphasis is on uniformity of pattern.

Radioactivity logs are used to determine optimum casing points after clean-out. Then all casing is stripped with the exception of the original 7-in. production string, which is adjusted to the optimum depth and cemented to the surface. Although the wells were shot when originally completed as producers, no reshooting has been done for conversion to water input.

Originally, water for flooding was obtained from four Douglas sand wells. However, this source became inade-

You can measure Brown & Root's EXPERIENCE in terms of DOLLARS



Almost four decades of diversified experience in heavy engineering and construction has built a background for Brown & Root that can mean dollars and time saved for your company. This fact is verified by the great number of repeat contracts awarded Brown & Root by a growing list of satisfied clients.

Brown & Root never accepts conventional procedures as final, and constantly probes for better methods in engineering and construction. Centralized responsibility coordinates this thinking and loyal personnel sees it through to fast economical completion.

If your company plans new construction or plant expansion . . . a call from you will place Brown & Root plant planning experts at your disposal . . . no obligation, of course.

BROWN & ROOT, INC. *Engineer-Constructors*

P. O. BOX 3, HOUSTON 1, TEXAS

CABLE ADDRESS — BROWNBILT

BROWN-BILT

Associate Companies:— BROWN ENGINEERING CORP. • BROWN & ROOT MARINE OPERATORS INC.

SSC's KANSAS DISTRICT OFFICE

The Kansas portion of the Anadarko Basin appears to contain reserves of oil and gas which have been barely touched.

In Kansas SSC crews have been continuously engaged in prospecting for petroleum since 1932 where they have since accrued more than 450 crew-months of seismic exploration experience.

The methods and techniques employed by SSC's Kansas District Office personnel are based on this long experience.

For information concerning seismic or gravity contract rates and crew availabilities, contact SSC's District Office in Wichita.

Write or phone Seismograph Service Corporation

108 Kock Building
Telephones 2-6437
Wichita, Kansas

Seismograph Service Corporation

Seismic Surveys — Gravity Surveys — Pilot Crews — Lorac
TULSA 1, OKLAHOMA, U.S.A.

World-wide Experience

quate when injection was commenced in 16 wells in November 1952. At that time a well was drilled to the Arbuckle and completed with a 135-hp. Reda pump set at 1,289 ft. on 4½-in. tubing.

Iron, hydrogen sulfide, and carbon dioxide content of the Arbuckle water has necessitated aeration and treatment with lime in the ratio of 15 lb. per 100 bbl. of water. An asphalt-lined earthen pit which provides 3-day retention for an anticipated 20,000 bbl. per day, allows settling and precludes the necessity for a coagulant such as lime. At present, no algaecide is needed.

From the settling pit, the water flows by gravity through four filter tanks containing anthrafilt, and thence to a 1,000-bbl. clear tank. Three triplex pumps driven by single-cylinder gas engines take suction on the clear tank and pump the water into the formation. Two more filters and three more pumps are being set to handle the increased volume for current expansion.

Producing wells are equipped with standard individual pumping units powered by single-cylinder gas engines. Each unit is rated for production of 500 bbl. per day of gross fluid through the 2½-in. tubing.

Statistics . . . Pertinent statistics for the DeMalorie-Sowder unit as of July 1, 1953, are:

Oil production, bbl. per day	420
Water input, bbl. per day	5,782
Cumulative water-flood production, gross bbl.	225,804
Cumulative water-flood production, bbl. per developed acre	949
Cumulative water input, bbl.	3,512,124
Cumulative water input, bbl. per developed acre	8,824
Acres developed	398
Acres responding to flood	128
Number of active oil wells	47
Number of active water-input wells	24

Ohio Oil's John Atyeo Communitization

Before flooding, 55 bbl. daily Peak flood oil 1,100, bbl. daily

Before the July 1947 initiation of water flooding, primary production had declined to 55 bbl. of oil and 56 bbl. of water per day on the John Atyeo Communitization now operated by Ohio Oil Co. However, increased production developed immediately after water injection commenced and in August 1949 reached a peak of 1,100 bbl. of oil and 1,050 bbl. of water per day.

The Bartlesville sand produces here from a net thickness averaging 29 ft. at an average depth of 2,188 ft. Weighted core analyses show average permeability to be 54.5 md., with porosity averaging 19.2 per cent. Indicated saturations are 20.3 per cent for oil and 55.2 per cent for water.

Original development of the lease was made by Transcontinental Oil Co. in 1926 and 1927, and peak production was attained those years. Decline in some areas was rapid to 1931; in other areas decline was normal until 1949.

The injection rate in the four pilot flood wells of July 1947 was 520 bbl. per day; and at the peak of the flood in August 1949 the rate was 3,025 bbl. per day. Presently, 5,134 bbl. of water is injected daily.

Water from the Arbuckle . . . Flood water is produced from the Arbuckle limestone at a depth of 2,682 to 2,733 ft. The supply well is producing approximately 800 bbl. per day through 2-in. tubing with a 21-hp. Reda pump set at 1,050 ft.

First step in treatment of the Arbuckle water is an aerating tower where the iron is oxidized, and the hydrogen sulfide and free carbon dioxide gases are liberated. Produced water, also aerated, mixes with the Arbuckle water in the aerating pit and the two flow by gravity through a chemical feeder into the settling pit.

Chemical treatment consists of the addition of 5 lb. of lime per 65 bbl. of water to remove solution iron and to reduce carbonate supersaturation for stability. Copper sulfate is mixed with the water when needed to kill algae growth.

From the settling pit the water flows by gravity through three sand-and-gravel filtering tanks and into a 500-bbl. clear-water tank. It is then raised to lease injection pressure of 800 psi. by electrically driven triplex pumps. A 4-in. trunk line and branch lines conduct the water to the well heads where it is metered.

"You mean you wasn't ready for me to start her spinning?"

Sinclair's Browning Unit

. . . Utilizes surface water for flooding

Water for injection on the Sinclair Oil & Gas Co. Browning unit project was originally obtained from four Douglas sand wells that produced into a closed system. However, as the flood was extended, it became necessary to lay an 8-in. line to the Verdigris River to obtain fresh water.

While the Verdigris water is filtered through two gravity-type rapid sand filters, Douglas water and produced water are filtered through a large slow sand filter. These filters feed into the suction of a centrifugal pump that raises the mixture to injection pressure.

The Browning unit contains 850 productive acres of which 180 acres are presently under flood. There are 71 active oil wells and 18 injection wells in a 10-acre, five-spot arrangement. These injection wells, with the exception of four drilled in 1951, are all converted oil or gas-injection wells.

Development progress . . . As development progresses, oil wells are cleaned out with cable tools, and the casing shoe cemented above the producing sand. The old pump jacks pulled by central power are being replaced by individual pumping units as well production warrants.

The daily average injection rate for July 1953 was 4,793 bbl. of water per day, and oil production was 271 bbl. per day.

BOOK

OIL IN THE SOVIET UNION. By Heinrich Hassman. Translated from the German with the addition of new information by Alfred M. Leeston. Published by Princeton University Press, Princeton, N. J. 173 pp. $3.75.

Dr. Hassman, writing in Western Germany, has explored one of the virtual unknowns in the Russian power equation: the oil industry. In a readable, nontechnical form, the author discusses the czarist framework in which the industry matured, then traces the development of the industry itself. Important oil-producing and refining regions are described, with strengths and weaknesses examined. The problems Russia faces in equating its supply of oil with the demand for it are analyzed, and comments advanced on the degree of success that can be expected for possible solutions to those problems. E. E. DeGolyer has written a foreword appraising the importance of translating this book into English. Eighteen maps have been included to help the reader follow the discussion closely.

"Wait!
..Don't

junk that old liner"

It's worth 35% at Mission

When Mission introduced Super-Service Liners with exclusive Satin Finish* in May, 1950, we provided the oil industry with **a better liner** in a competitive price range to match the long-life quality of Mission Pistons, Valves, Rods and Rod Packing.

Now, Mission has done it again! We can now provide you with reduced size, induction hardened **RENEWED LINERS with Satin Finish*** that will give new liner service at 35% less than new liner cost!

HERE'S ALL YOU DO: When your mud pump reduced size liners (see note) become worn and need replacing, just turn them in to your supply store.

HERE'S WHAT YOU GET: Your supply store will deliver to you a guaranteed Mission RENEWED Liner with Satin Finish* at 35% less than new liner cost. Mission RENEWED Liners are reworked both inside and out to new liner specifications.

HERE'S WHAT IT COSTS: Your old liner is worth 35% of the cost of a new Mission Liner of the same size. Thus, you get a guaranteed RENEWED MISSION LINER with SATIN FINISH* for only 65% of the cost of a new liner.

NOTE: There are a few makes of liners of special material that are not suitable for renewing.

PLACE YOUR ORDERS TODAY AT YOUR SUPPLY STORE FOR MISSION RENEWED LINERS WITH SATIN FINISH*.

*Trade Mark Registered U. S. Patent Office.

Guarantee

[illegible] RENEWED Liners with [illegible] carry the same satisfactory service guarantee as new Mission Super-Service Liners.

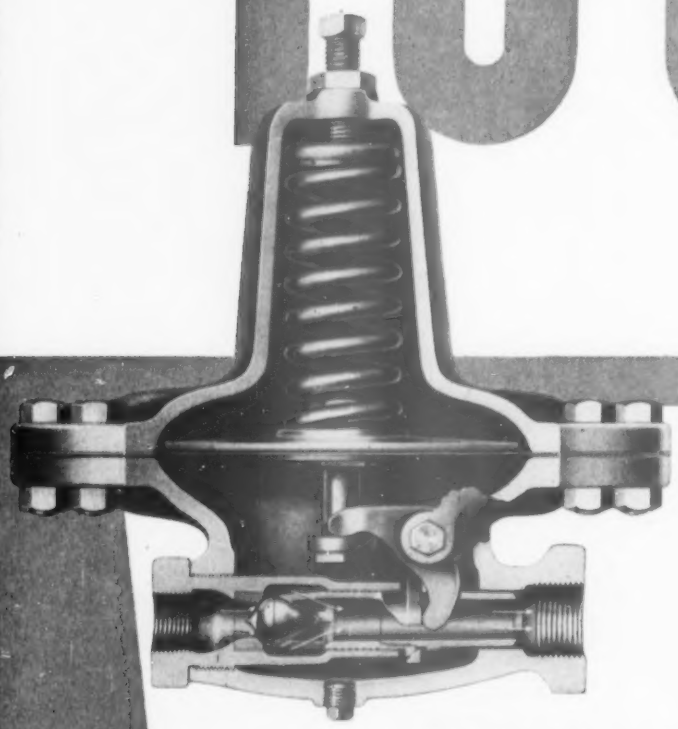
MISSION
MANUFACTURING CO.

P. O. BOX 4209 • HOUSTON, TEXAS

Export Office: 30 Rockefeller Plaza, New York

* Trade Mark, Registered U. S. Patent Office.

TYPE 1000 VALVE



Any product of quality should be dependable when *ordinary* products fail. Sudden pressure fluctuations, dirt, scale and viscous matter prove "fatal" to ordinary pressure reducing valves.

The CASH STANDARD TYPE 1000 VALVE however, is designed to operate with complete dependability under the most difficult and unusual circumstances. Many of these units have been in service over 10 years and have never been taken "out of the line."

Truly an *EXTRAORDINARY* achievement of quality and design excellence.

INSTALL CASH STANDARD "TYPE 1000" VALVES

CASH STANDARD **DECATUR, ILLINOIS**

A. W. CASH COMPANY

Natural Gas to Alcohol

(Continued from page 64)

The new employes were given the following reputable tests:

1. Purdue Research Foundation aptitude test.

2. Purdue Research Foundation industrial-training application test.

3. Eugene J. Benge basic employment test.

These tests were originally given to determine if any correlation could be found between the test results and later proven ability. As a result of this, these three tests are now given on a preemployment basis to filter out unqualified applicants for this type of work.

General training . . . Following these induction tests, the employes received the following general training:

1. **Orientation.**—An introductory period of 18 hours was spent in acquainting the employes with company policies on labor, personnel routine, retirement, and group-insurance plans.

2. **Safety.** — A period of 10 hours was devoted to safety lectures, demonstrations, and films on both accident prevention and first aid, with special emphasis on gas and chemical hazards.

3. **Fire.**—A period of 9 hours was spent on this phase. Fire prevention was handled in the classroom by films and lectures. Fire fighting was handled in the field by demonstration and drill with special emphasis on hydrocarbon fires.

4. **Supervision and discipline.**—Five hours were spent on supervision, discipline, and a discussion on the employes' hand-book.

The next step in the program consisted of 1-hour lectures covering all of the basic subjects essential for understanding the underlying fundamentals related to the operation of a hydrocarbon-recovery unit. The following indicates the scope of this training:

	Hours
Absorption and dehydration	2
Chemistry	4
Combustion	1
Control testing	2
Distillation	3
Heat and pressure	3
Instrumentation	14
Maintenance	11
Process equipment	4
Production control	1
Utilities	1
Total	46

These lectures were followed by written examinations from which it was possible to follow the individual progress being made.

Plant trips . . . The formal classroom training was augmented by field trips throughout the plant. Qualified personnel conducted tours through the hydrocarbon-recovery units, the chemical plants, the power house, and the water-treating plant. Here most of the operators came into visual contact with equipment they had never even heard of before.

Following the above preliminary studies, the personnel were split into three groups: (1) extraction unit, (2) fractionation unit, and (3) loading and storage. The groups assigned to the operating units received further detailed instruction in plant startup, normal operations, and shutdown procedures. The group assigned to loading and storage received instructions for that phase of operations.

At the conclusion of the above 60-day training period, operator classification and shift assignments were made. Classification was based on a careful examination of employment and classroom tests, attitude, personality, education, experience, age, and upon shift supervisors' ratings.

An important feature of the entire course was that each employe received complete operational training for the unit to which he was assigned. Each operator was thus given an equal opportunity to learn over-all plant operation with a view to future promotion.

The results of the training period after 3 months of operations can be summarized as follows:

1. The formal training plan was both suitable and adequate. As would be expected, experience is required at this time to develop the new men into A-1 operators.

2. The classification of the operators into their different positions was very well made.

3. The results of the employment and plant tests will be used as part basis for future promotions. Qualification tests, experience, and supervisors' rating will constitute the remaining basis.

Initial Startup

The operators were first assigned the task of checking the unit for completeness using mechanical drawings as a guide. Next followed a 100 psi. air test throughout the vessels and maze of piping. Despite a previous hydrostatic test on all equipment, numerous leaks were still found.

The reboiler furnaces were dried out for 3 days and most of the centrifugal pumps were run in on water. Several pumps seized during this period due to operator inexperience on multistage centrifugals, and investigation also showed some of the vertical-type pumps had been shipped from the factory with the impellers not keyed to the shaft.

Factory representatives checked the centrifugal compressors and the steam-turbine drivers. Governor trouble was corrected and some of the steam piping realigned and supported to give smoother running on the machines. Each compressor was run in at 400-600 r.p.m. for several hours using air. The air was discharged throughout the refrigeration system to dry it out. The system was then gas purged, filled with propane, and alcohol added to the lower-temperature surge drums.

Getting out the water . . . This was followed by a gas purge over the unit. Fyrite oxygen analyzers were used to indicate the completeness of the purge. Panhandle gas was then cut in through the dehydrators, light-oil absorbers, heavy-oil absorbers, and back to the Panhandle compressor station. The heavy-oil system was circulated to supply heat to regenerate the dehydrators. The gas cycle was kept up for several days until the return dew point had dropped from $+60°$ $-40°$. It was of the utmost importance to remove all water from the system due to the low operating temperature level.

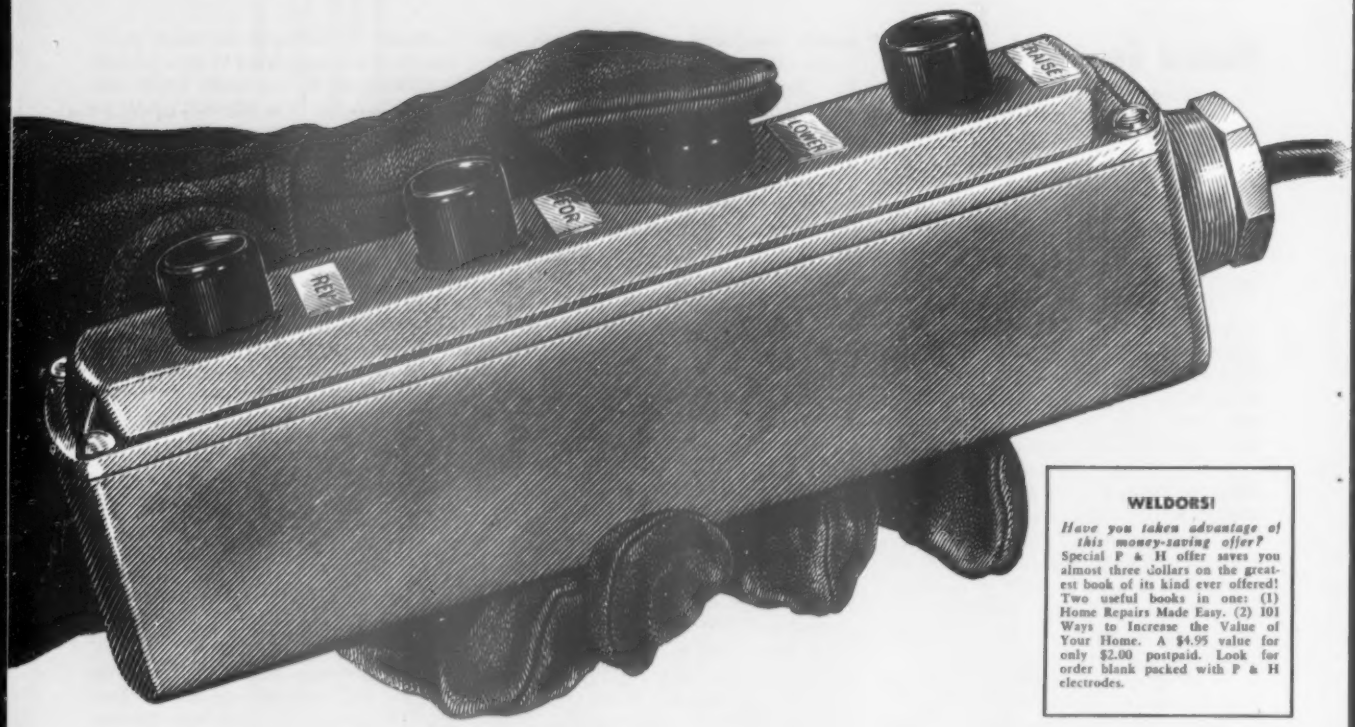
The gas cycle was cut off and the light-oil circulating system started. During this period, the unit was continually drained at all low points for water removal.

The thoroughness with which the unit was dried out was indicated by the fact that no freezeup troubles were encountered in exchangers during the startup although such freezeups had been anticipated. In addition, good dehydration on the inlet gas is required to prevent hydrate formation which is most difficult to remove from equipment.

Plugging . . . Shortly after extraction operations had commenced, plugging on one set of the cold rich light oil—warm lean oil exchangers occurred. The plug, much to our dismay, was discovered to be Sovabead desiccant from the dehydrators. It was necessary to shut the unit down immediately and determine which dehydrator had lost its charge.

By blowing down the bottom of the dehydrators, one was found which discharged Sovabead. Upon opening this tower, it was found a small opening existed (1¼ in. by ⅞ in.) at the bottom support through which the desiccant passed down and was carried out by the incoming gas into the bottom of the light oil absorbers. Fortunately, the trouble was found before the Sovabead had been carried into all of the extraction unit.

As it was 3-4 tons of Sovabead entered the unit and several days were spent blowing and washing it out of absorbers, exchangers and lines. Sovabead lay around parts of the unit like snowbanks. To date, no further un-



WELDORS!

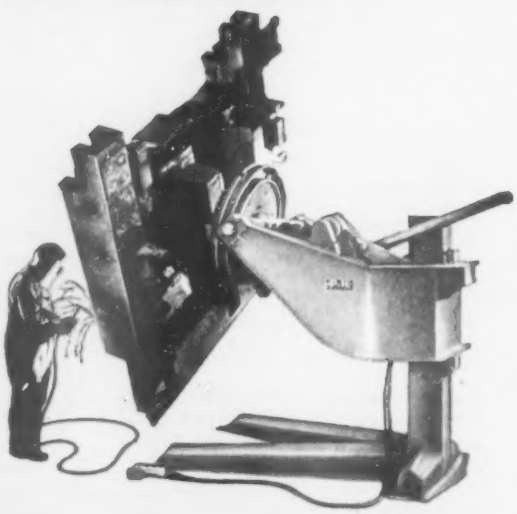
Have you taken advantage of this money-saving offer? Special P & H offer saves you almost three dollars on the greatest book of its kind ever offered! Two useful books in one: (1) Home Repairs Made Easy. (2) 101 Ways to Increase the Value of Your Home. A $4.95 value for only $2.00 postpaid. Look for order blank packed with P & H electrodes.

One finger is enough

to position heavy workpieces for fast, economical downhand welding

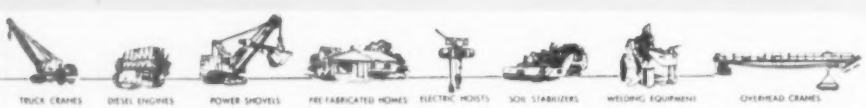
- with P&H positioners

Cut costs as much as 50% — position the weldment, not the operator! A touch of a control button does the work — saves handling time. Welding is downhand — permits using a larger rod for faster deposition. Welds are smooth, uniform. P&H Positioners are available in capacities from 2500 to 36,000 lbs. — remote-control and hand-operated models. Ask your P&H representative or distributor for further information — or write us.



P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4527 WEST NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

the P&H *Line*



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

P&H

Arc Welders and Electrodes

put welding in your plant on a low-cost, high-production basis

P&H DC RECTIFIER WELDER

Has Dial-lectric Control for instantaneous heat selection at the work. Three sizes, 200, 300, and 500 amps., NEMA rated.

P&H WELDING TWINS

P&H AC WELDER

Has P&H Dial-lectric Instantaneous Remote Control. Sizes up to 625 amps., NEMA rated. Connectable to 220 and 440 volts.

P&H WN-301 Engine-Driven DC ARC WELDER

Portable. Equipped with Dial-lectric Control. Runs at only 1750 rpm. Welding service range, 60-375 amps., NEMA rated.

P&H LOW-HYDROGEN ELECTRODES

13 types that take the problem out of welding high-sulfur, free-machining, low-alloy, and high-strength steels; castings, etc.

Ask your P&H representative or distributor for complete information, or write for free bulletins.

P&H WELDING DIVISION

HARNISCHFEGER CORPORATION

4527 W. National Ave., Milwaukee 46, Wis.

Natural Gas to Alcohol

fortunate incidents such as this have occurred.

Mechanical seals . . . All of the pumps are equipped with mechanical seals and initially this was a constant source of trouble. Small particles of rust and dirt, and icing of the seals aggravated the situation. Adjustment of the spring tension and proper O-ring installation solved some of the trouble. Steam tracing on the seal glands on another set of pumps has also helped. Seal trouble is still being encountered on occasions. Some mechanical engineers recommend using packed pumps during the first few months of operation and then replacing the packing with seals.

Bearing trouble was encountered on the motor drives on one set of vertical centrifugal pumps. This, at times, caused excessive vibration and the pumps had to be shut down. This problem was solved by installing a heavier type bearing which was able to carry the load.

To date, considerable mechanical difficulty has existed on the centrifugal-compressor installation. Two 4,000-hp. units operate in parallel at 7,500 r.p.m. on the extraction unit. These provide a refrigerating capacity equivalent to the manufacture of 4,850 tons of ice per day. Propane is vaporized into various stages of the same machine rather than having separate compressors. Separate suctions are provided for each of five stages, namely, −30°, −20°, 27°, 48°, and 70° F.

Initially, only one machine was placed in operation. Four of the suction lines and the discharge line contain butterfly valves. When the steam-turbine ring pressure drops to 200 psi. a solenoid valve goes into action and the butterfly valves close. This installation was made to prevent reversal of rotation on the compressors when being shut down.

On one occasion, the machine stopped for some undetermined reason. When discovered, the machine was reversing at a high rate of speed. It was also noted that the linkage on the butterfly valves had slipped and so did not close.

The reversal of rotation burned out the thrust bearing on the turbine drive. The bearing was rebabbitted and the machine placed back in operation. After a few days, the thrust-bearing housing became hot and again the machine was shut down. Inspection revealed the bearing was badly wiped. It was also discovered that due to too much play in the shaft the turbine blading had been badly damaged by jimming against the guide vane. The rotor was returned to the factory for the necessary reblading.

Check valves were then installed in the oil line on the turbine drives to prevent the oil from being sucked from the thrust bearing during reverse rotation. This move has been very successful and a positive oil pressure is now held on the bearings during reverse flow. The compressor representatives have stated this type of flow is not harmful to their machines.

Another improvement was made by reducing the closing action on the butterfly valves from a 25-second period to only 1 second. Even with this fast action reverse flow is still experienced when a machine is shut down. However, with the previously mentioned check-valve installation, the thrust bearings no longer burn out.

Another difficulty experienced was the rupture of expansion bellows on the compressor discharge line. Three such failures occurred over a period of 8 weeks. Piping calculations were then made which indicated the expansion joints were not needed and have since been replaced by solid piping. Two of the suction lines were equipped with the same type of joint but to date, have not failed.

Refrigeration compressors . . . The operation of the 4,000-hp. refrigeration compressors is very unstable when two units are placed in parallel operation. When the second unit is cut in, surging, excessive vibration, and a decrease in refrigeration capacity result. Fortunately, the operators stuck to their jobs and eventually mastered the situation.

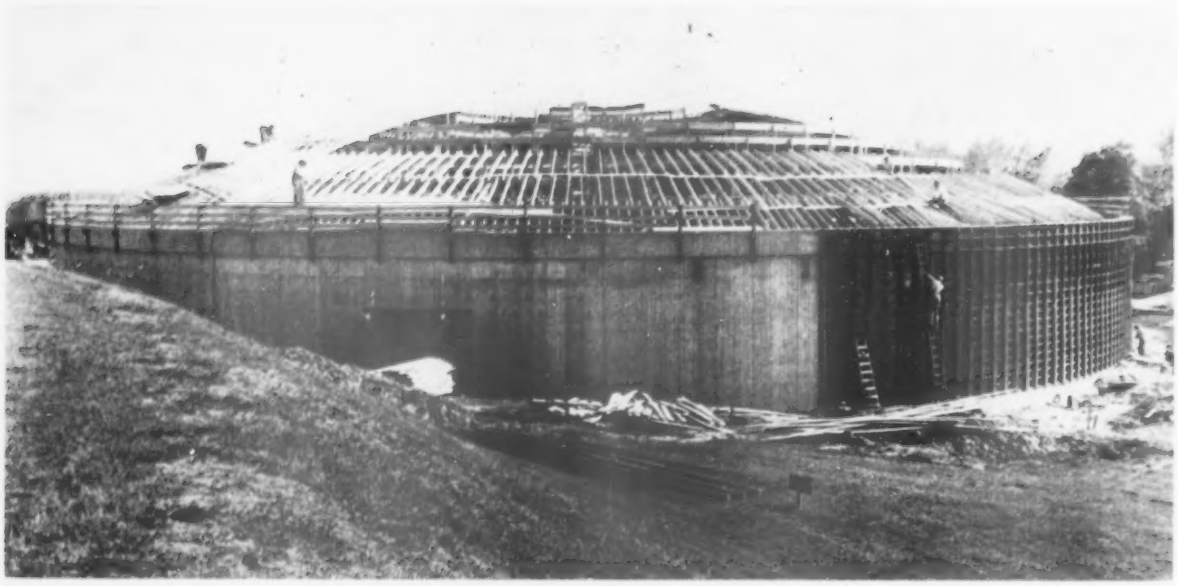
The following procedure is now used when bringing the second unit on line:

1. The speed of the machine in operation is reduced from 6,200 to 5,500 r.p.m. The critical is reached at 5,300 r.p.m. so that the speed cannot be reduced as much as desired.

2. The vapor load is increased by bypassing the discharge back to the suction drum. This decreases the possibility of "starving" the main 20-in. suction line which is a common header for both machines.

Initially, the attempt was made to balance the load by closing or opening the suction-valve positions on each machine. However, with five suctions to each machine, this "juggling" act proved impractical.

3. The main suction pressure is then decreased slowly. This is done by gradually speeding up both machines and cutting back on the recycle. Surging occurs during this operation and very close operator attention is required. Any slight upset on the unit which lightens the refrigeration load will also cause surging even after the machines have been lined away.



FORMS FOR DOME of a prestressed concrete tank are shown here. They consist of a standard wooden-rib construction supported by columns. To the left can be seen wood sheeting which is nailed to the rib construction. Dome is poured before horizontal prestressing is applied to the shell.

Why Prestressed Concrete in Refinery?

A simple means of eliminating cracks in concrete is through prestressing. This article underlines the basic principles of prestressed concrete, advantages and disadvantages and importance to the industry.

by J. S. Bell and D. R. DeVeaux

MAINTENANCE costs in most refineries could be materially slashed by the use of concrete construction. However, small use has been made of concrete because of one inherent disadvantage—it cracks under negligible tensile stresses.

This deficiency has been partially overcome through use of steel reinforcing rods embedded in the concrete. While most industries have been satisfied with this type of concrete, those who deal in the storage and movement of liquids have not, simply because the concrete will still crack. These are small cracks in most cases, but unfortunately not small enough to prevent loss of valuable hydrocarbons.

Prestressing concrete is a simple means of eliminating this drawback of concrete in construction. It is the intent of this paper to underline the basic principles of prestressed concrete and to show the advantages and importance of this material to the petroleum industry.

Authors with Esso Standard Oil Co., Bayway refinery, Linden, N. J. Paper presented at A.S.M.E. meeting, Houston, September 28-30, 1953.

What Is Prestressing?

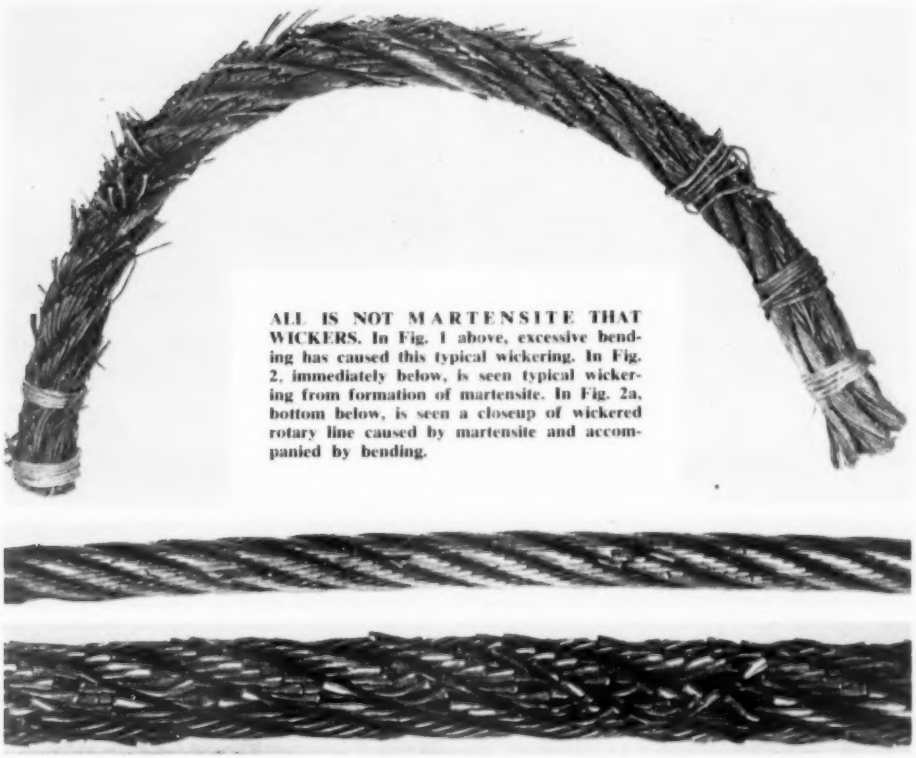
The main concept of prestressing consists of precompressing the concrete to such an extent that, under given design conditions, no tensile stress will be developed. The idea itself is much older than concrete—perhaps dating back to the human who first reinforced a wooden wheel with a steel hoop.

Normal reinforced concrete . . . To visualize the effect of prestressing consider Fig. 1. First, upon examining the

(Continued on page 87)

TABLE 1—QUANTITY COMPARISON—CONVENTIONAL VS. PRELOAD

Item—	Unit	Conventional design	Preload design	Saving	Per cent saving
Hunts Point Sewage Treatment Plant, Bronx, N. Y.—8 tanks:					
Concrete	C.Y.	17,840	11,060	6,780	38
Steel	Ton	1,642	474	1,168	72
North East Treatment Works, Philadelphia, Pa.—8 tanks:					
Concrete	C.Y.	18,800	12,080	6,720	36
Steel	Ton	2,300	910	1,390	60
Hyperion Sewage Treatment Works, Los Angeles, Calif.—18 tanks:					
Concrete	C.Y.	24,550	12,890	11,660	46
Steel	Ton	2,510	561	1,949	78
Owls Head Sewage Treatment Plant, Brooklyn, N. Y.—8 tanks:					
Concrete	C.Y.	8,824	4,741	4,083	46
Steel	Ton	904	275	629	70



ALL IS NOT MARTENSITE THAT WICKERS. In Fig. 1 above, excessive bending has caused this typical wickering. In Fig. 2, immediately below, is seen typical wickering from formation of martensite. In Fig. 2a, bottom below, is seen a closeup of wickered rotary line caused by martensite and accompanied by bending.

Martensite Bad Medicine for Drilling Lines

. . . but all wickering is not a result of martensite; other, and correctable, factors may be causing the damage

by C. M. Zerr

FORMATION of martensite in a rotary drilling line is caused by rapid heating and cooling of the line while in operation. Martensite is characterized by extreme hardness and internal stresses, and by the brittle characteristics it imparts to the line.

The cutoff procedure seems to be the best answer to this problem. A system should be developed for the frequent moving of the line through the reeving **before** the notches started by martensite have an opportunity to cause wire fractures. Care must always be taken in cutting off the rope so that the pickup point on the rope in one setting will not become the pickup point at any future setting.

Operating conditions . . . Rotary line is subject to operating conditions which cause wear, fatigue, crushing, and wickering. In practically all cases, the driller can readily determine from observation the cause of the wear, fatigue, and crushing. The wickering, on the other hand, is found in places which do not seem to follow any set pattern. Many times these wickers appear at the most inopportune times and places, creating a condition which requires that several hundred feet of rope be cut off. This practice is expensive.

When a wire rope is operating over relatively small sheaves, a series of wickered wires or "crown breaks" as they are sometimes called, frequently develop. A typical case is illustrated in Fig. 1. Under such conditions, it is easy to determine the exact cause and take steps to remedy the situation. Increasing the sheave diameters, or installing a more flexible rope, is the usual procedure for correcting such abuses.

This, however, does not account for the scattered and spasmodic breaks that appear on the wire rope operating over standard, properly designed and maintained sheaves. It is these latter breaks which cannot be so readily explained by the usual observations or measurements with the conclusion, "Here is the cause," that are to be discussed. It is these breaks that sometimes cause the excessive loss of rope. Fig. 2 is a typical illustration of the type of wickered wires which are being considered.

Drilling Practices

The drilling practice, as pertaining to wire rope, is strictly a hoisting operation, raising, lowering and partially supporting a long, slender column of drill pipe of varying weights and to all depths. The hoisting is accomplished by winding the rope on a drum (draw works) and through a "block" containing a number of sheaves for a mechanical advantage.

In the hoisting operation, the fast line, or that line going to the drum, is

Author is associated with Union Wire Rope Corp., Kansas City. Presented at the Petroleum Mechanical Engineering Conference of A.S.M.E., Houston, September 28-30.

Fig. 3—Improved plow-steel wire showing uniformity of fibers.

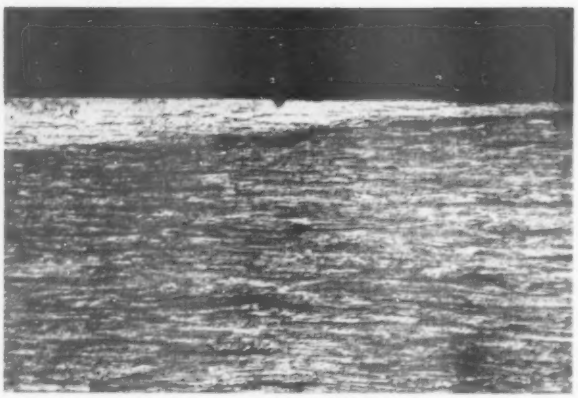


Fig. 4—Martensite on crown of wire.

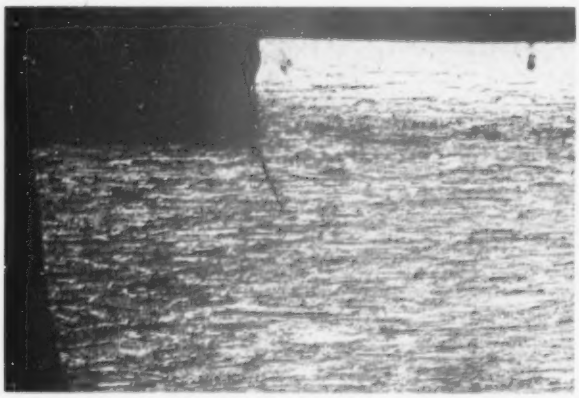


Fig. 5—Crown break as a result of fracture lines through wire.

Fig. 6—Fractures extending through martensite and into the steel wire.

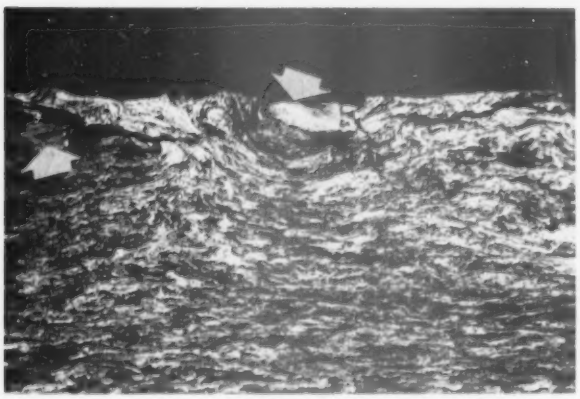


Fig. 7—Effects of pressure and heat on rope wire.

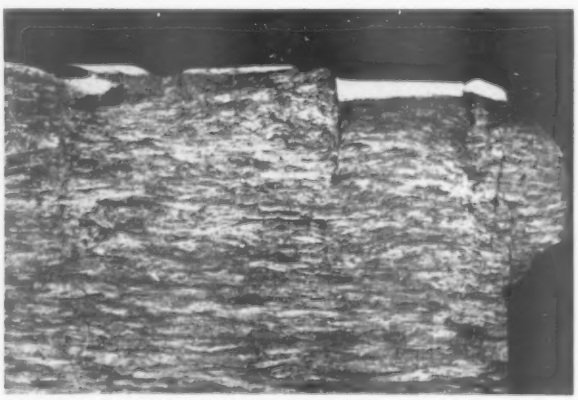


Fig. 8—Distortion of wire structure with traces of martensite.

subjected to a number of physical forces that are by their nature and effect. very destructive to the rope. Among these forces are the following:

1. Shock loads, as when the elevators grip the drill pipe.

2. Excessive whipping, probably started by an uneven wrapping of the rope around the drum.

3. Crossover wear, which is an inherent characteristic of multiple-layer winding.

4. Crushing, which is caused from a combination of the winding and loading.

5. Creep over the sheaves, from the stretching of the rope as loads are applied.

Motion, speed, crushing, and creep represent an expenditure of energy. Some of this energy is dissipated as heat with the cold-drawn wire of the rope absorbing the heat with an accompanying change in the grain or fiber structure of the steel. The change in structure is very detrimental to the wire. With the exception of a few cases, the cause and effect cannot be observed at time of occurrence.

One of the very common forms of the transformation is known as martensite. Martensite is formed by a fast, almost instantaneous quench from temperatures around 1,300° F. The material thus formed is characterized by extreme hardness and internal stresses. In an attempt by the steel to relieve these internal stresses, the needle-like

NEW, Power-Packed AND READY TO GO!

NEW U-1091 natural gas power unit develops 187 net h.p. at 1400 rated r.p.m.; 200 net h.p. at 1600 max. r.p.m.; maximum torque, 820 lbs. ft. @ 800 r.p.m.

NEW U-450—102 net horsepower at 1800 rated r.p.m.; 110 @ 2200 r.p.m.; maximum torque, 324 lbs. ft. @ 1200 r.p.m.

NEW U-406—91 net horsepower at 1800 rated r.p.m.; 98 @ 2200 r.p.m.; maximum torque, 279 lbs. ft. @ 1200 r.p.m.

NEW U-372—83 net horsepower at 1800 rated r.p.m.; 91.5 @ 2200 r.p.m.; maximum torque, 263 lbs. ft. @ 1200 r.p.m.

NEW U-269—62 net horsepower at 1800 rated r.p.m.; 72 @ 2400 r.p.m.; maximum torque, 191 lbs. ft. @ 1200 r.p.m.

NEW U-240—55 net horsepower at 1800 rated r.p.m.; 64 @ 2400 r.p.m.; maximum torque, 168 lbs. ft. @ 1200 r.p.m.

NEW U-220—50.5 net horsepower at 1800 rated r.p.m; 62 @ 2400 r.p.m.; maximum torque, 151 lbs. ft. @ 1200 r.p.m.

IH Announces Seven New International Engines

Seven new six-cylinder, carbureted, valve-in-head engines have been added to the International line, which now includes 18 models—diesel, gasoline or gas—ranging from 16.5 to 200 net horsepower.

These new models are the result of more than 45 years of IH engineering and manufacturing experience building a complete line of heavy duty engines for tractors, trucks, construction and oil field equipment and individual power unit applications.

These new units have the durability, flexibility and economy to meet your requirements for lower cost performance. The unmatched network of IH district offices, parts depots, distributors and dealers puts complete service facilities practically at your door.

If you are an individual user of engines, it will pay you to see your nearest International Industrial Distributor or Power Unit Dealer for more complete information. If you are a manufacturer, your nearest IH district office will be glad to help you engineer these engines into the equipment you are building.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS

INTERNATIONAL

BEST ALL-AROUND PLAIN END PIPE COUPLING ON THE MARKET!

HERE'S WHY... *The Roust-A-Bout grips (teeth) take a strong, positive, circumferential bite on the pipe—as does a Tubing or Pipe Slip. The curved grips assure maximum gripping area for greatest holding power. This is the exclusive Roust-A-Bout, bull dog grip.*

Why accept less than the best when you are using plain end pipe couplings? Victaulic Roust-A-Bouts are specially engineered to provide the most reliable pipe connections you can use. With inclined, curved grips they bite into pipe circumference—provide a far stronger and surer hold.

Roust-A-Bout Couplings are just what the name implies—reliable, sturdy, adaptable and ingenious—ready for those tough field jobs where only plain end pipe is used or where the simple Victaulic Groove Method is not quickly available.

Victaulic Roust-A-Bouts are quick and easy to install:...

- You *cut* and *couple* your pipe as you go!
- You can use *plain* or *beveled end* pipe!
- You can use *new* or *used* pipe!
- For use on *permanent* piping or *repair* work!
- You need only one tool—a *socket wrench!*
- Roust-A-Bouts are simple and factory finished!

For your next job—insist on the best—Victaulic Roust-A-Bouts. They're available at all Victaulic Stocking Supply Houses in pipe sizes—2", 2½", 3", 3½", 4", 5", 6", and 8".

Write today for the Victaulic Roust-A-Bout Catalog No. 44-8F.

VICTAULIC COMPANY OF AMERICA • P. O. BOX 509 • **ELIZABETH, N. J.**

Office and Plant: 1100 Morris Ave., Union, N.J. • Telephone Elizabeth 4-2141
West Coast: Victaulic Inc., 2330 East 8th St., Los Angeles 21
Canada: Victaulic Co. of Canada Ltd., 406 Hopewell Ave., Toronto 10
Export: Pipe Couplings, Inc., 30 Rockefeller Plaza, N. Y. 20, N. Y.

martensitic structure is prone to develop cracks.

Fractured or Wickered Wires

Fig. 3 is an illustration of a typical high-carbon (.70 to .80C) cold-drawn steel wire. Note the uniformity of the fibers throughout the entire longitudinal section. Investigation of the fractured wires in wire rope, especially rotary lines, usually shows evidence of a structural change having taken place. In studying the fractures of the rotary line which is illustrated in Fig. 3, we find that a complete change has taken place along the surface.

Fig. 4 is a longitudinal section of a wire along that portion which would be in contact with the drum, sheave, or adjacent wraps of rope. The tapered thickness of the structural change, which can be observed along the surface of the wire, is the result of the double helix formed by the wire in a rope. The crown of the strand, which is the point we see as surface wear, receives the brunt of the sliding and pressure with a tapering of the pressure to zero where the wire bends into the rope. This wire has not fractured, but it is obvious that something has developed on the surface. This change can only be attributed to an application of heat and a quench forming a new iron-carbon equilibrium.

Fig. 5 is another longitudinal section of a typical crown break. Here again, we find the change of structure along the surface. This new structure is known as martensite. In this illustration fracture lines are developing through this surface change, and extending into the normal structure of the wire. Fig. 6 shows these fractures extending into the wire. The broken end is clearly the result of a fracture line extending completely across the cross-section of the wire causing it to break. This the driller sees as a wicker and where wickered wires appear, other wires are in the process of breaking and the ultimate strength of the rope is greatly reduced.

Heat is generated in many of the uses of wire rope as has already been noted. Many times it is possible to observe sparks fly off a rope as it hits against another iron or steel surface or even against itself. When such sparking takes place, it can be certain that enough heat has been generated to create a brittle structure on the wire. This hard brittle substance, which is formed on the crown of the wires, is only good for resistance to abrasion while under compression.

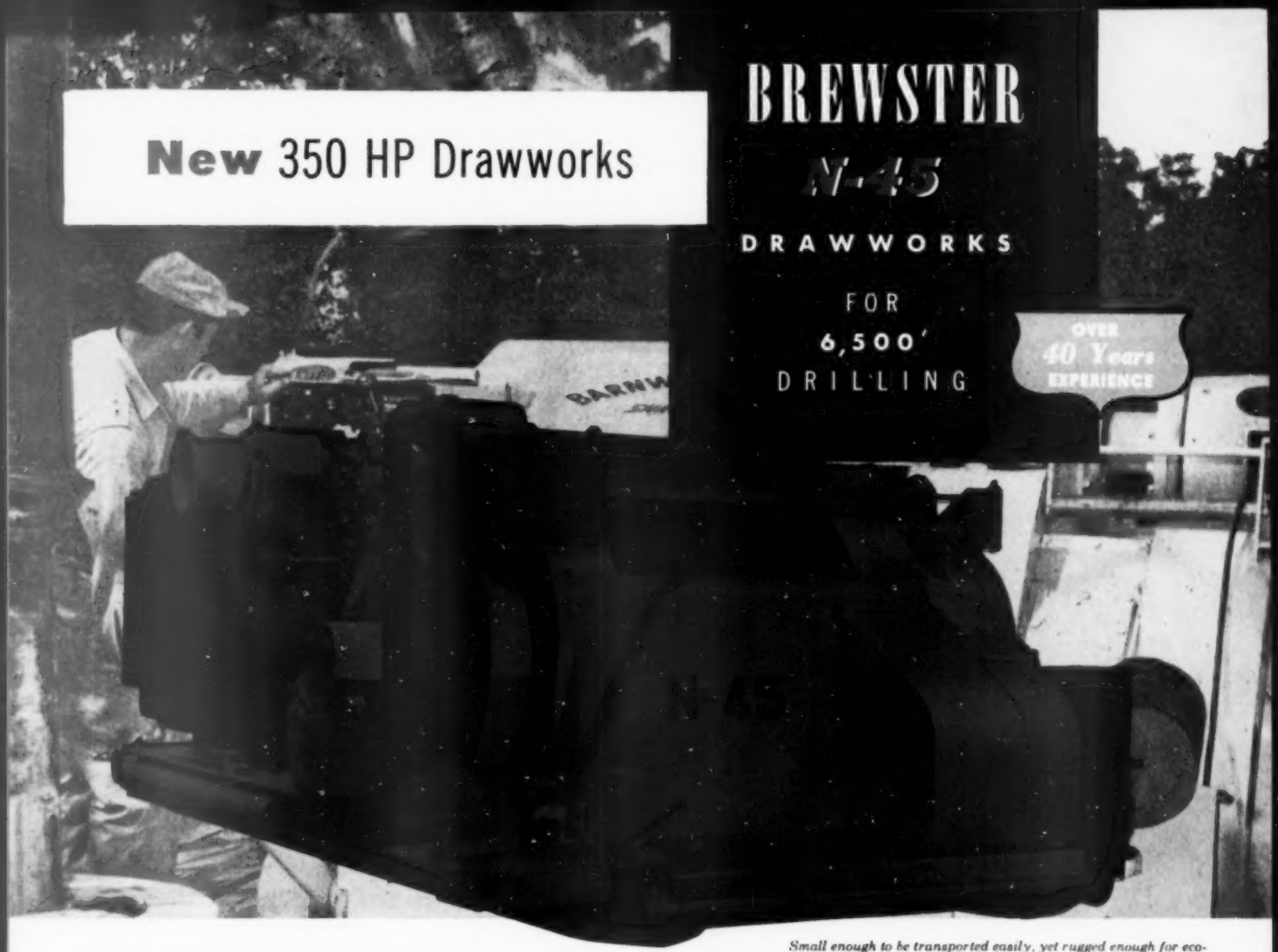
In wire rope, the wire is under tension. This tension, coupled with the inherent characteristic of martensite to develop internal stresses, causes cracks

New 350 HP Drawworks

BREWSTER N-45 DRAWWORKS

FOR 6,500′ DRILLING

OVER 40 Years EXPERIENCE



Small enough to be transported easily, yet rugged enough for economical 6500-foot drilling. Any type engine of up to 350 horsepower may be used by simply selecting proper engine sprocket.

The compact N-45 torque converter drawworks, patterned after the proven design of other Brewster-engineered equipment, meets the need for a flexible rig suitable for 6500-foot drilling or deep well workovers. Brewster's experience and skill in manufacturing fine rotary drilling equipment have been combined to produce a rig that will keep down-time and drilling costs at the minimum. The N-45 is only eight feet wide to meet all highway transportation regulations.

Controls—All controls air operated and conveniently located at driller's position in a central control panel.

Drum—Drum core, 18 inches in diameter by 46 inches in length, built for long wire line life. Drum shaft 6 inches in diameter for extra strength.

Transmission—Chain type transmission has two forward speeds obtained by friction clutches and a reverse speed. Driller can shift from high to low without stopping load.

Brakes—Water cooled, full wrap, self-energizing brake is compounded for easy holding of heavy loads. Auxiliary 15 inch Double Hydromatic brake is built into drawworks housing.

Chains—Transmission and drum drive chains 1¾-inch pitch double high speed roller type in oil bath. Rotary drive countershaft has 1¾-inch pitch single chain. Hydromatic brake driven by 1¼-inch pitch triple chain from drum shaft with disconnecting clutch on drum shaft to eliminate chain running except when brake in use.

Clutches—All clutches air operated. Drum has auxiliary positive clutch for safety in case friction clutch fails.

THE BREWSTER COMPANY, INC.

SHREVEPORT, LOUISIANA

BREWSTER DRILLING EQUIPMENT

ASK YOUR SUPPLY HOUSE TO TELL YOU ABOUT THE NEW N-45 DRAWWORKS

SUPPLY HOUSES - *Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company • Bovaird Supply Company • Industrial Supply Company • In Canada: Rocky Mountain Supply Company – Direct and through recognized export dealers.*

to form. These cracks, when acting at notches on the surface of the wire, start transverse fractures. The fractures then become the wickered wires, which can easily be recognized along the rope.

Formation . . . It is rather difficult, at first, to fully appreciate the action pertaining to the development of martensite which is going on while pulling drill pipe. Wire rope is built like a string which stretches and contracts as loads are changed. Excluding the effect of friction, for the moment, the tension in a line is the same from draw works to tiedown. Therefore, when a load is applied to the rope, it stretches equally throughout the entire length, including that part which is flexed around the sheaves and drum.

In actuality, there are motion, pressure, and friction where the rope moves on the sheave and drum. These three, motion, pressure, and friction, generate heat. Although the rope seldom gets warm to the touch, still, the heavy pressures developed between the groove surface and the crown points of the rope, accompanied by the sliding of the rope as it stretches when the load is applied, results in production of elevated temperatures on the surface of the steel wire. The large mass of steel acts as a quenching medium, thus quickly dissipating the heat.

Fig. 7 shows the presence of martensite (see arrows). Of more interest is the peculiar formation of the wire structure around and below these two pickets. Considerable pressure and heat has evidently been applied to this wire to cause such a drastic change of the structure. Fig. 8 is another typical example of the effect of the heat that is generated, and pressures that are encountered. The traces of martensite along the surface again afford ample evidence that broken wires can be caused by this brittle carbide.

Results . . . Whether the film of martensite is only a trace, or penetrates the wire to an appreciable, measureable amount, the effect on the wire is always the same, namely, early, accelerated fatigue fractures. Many operators have been nonplused at the erratic service of drilling lines, particularly when checking the amount of rope cut off during drilling. With no apparent reason, the driller finds it necessary to cut off as much as 800 ft. or more of rope, whereas, he had been cutting 25-50 ft. The formation of martensite is the basic cause of the difficulty.

The cutoff procedure seems to be the best answer to this problem. The practice of cutting off or slipping the rope through the reeving system has been practiced since the introduction of rotary drilling. The practice has been carried out in a rather haphazard method. The cutoff was determined by the experience of the driller or condition of the line. The random procedure has, in recent years, been the subject of critical analysis as deeper holes are drilled and heavier loads are applied, placing more exacting demands on the wire rope.

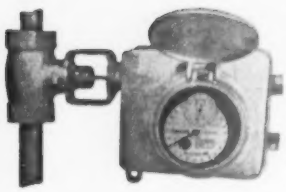
Not being able to eliminate drum crushing, crossover wear, shock loads, whipping, or creep, the most satisfactory procedure is to incorporate a frequent and systematic moving of the line through the reeving **before** the notches, started by the martensite, have an opportunity to cause wire fractures.

Care must always be taken in cutting off the rope so that the pickup point on the rope in one setting will not become the pickup point at any future setting. Properly evaluating the work performed by the line and systematically moving it, either by slip-throughs or cutoffs, minimizes the full effects of the martensite.

Save HOURS in the FIELD

ENARDO TIME CYCLE SWITCHES

Enardo "MB" and "A" model time-cycle switches pay for their cost in a matter of weeks by drastically decreasing return trips to shut down equipment. These automatic clock mechanisms, provided in 12 and 24 hour operating cycles, can be used to start or stop pumping engines . . . lighting circuits . . . electric motors . . . etc. Normal operating capacity for the "A" Mercury tube switch is 450 Watts open or closed circuit. Tube switches of higher wattage are available on request. The "MB" micro-switch operates at 60 Watts D.C. or 1250 Watts A.C., open or closed circuit. Switches are dust, fire, tamper and explosion proof. Write for Enardo bulletins 10-01, 10-03.



ENARDO CLOCK SHUT-OFF VALVE

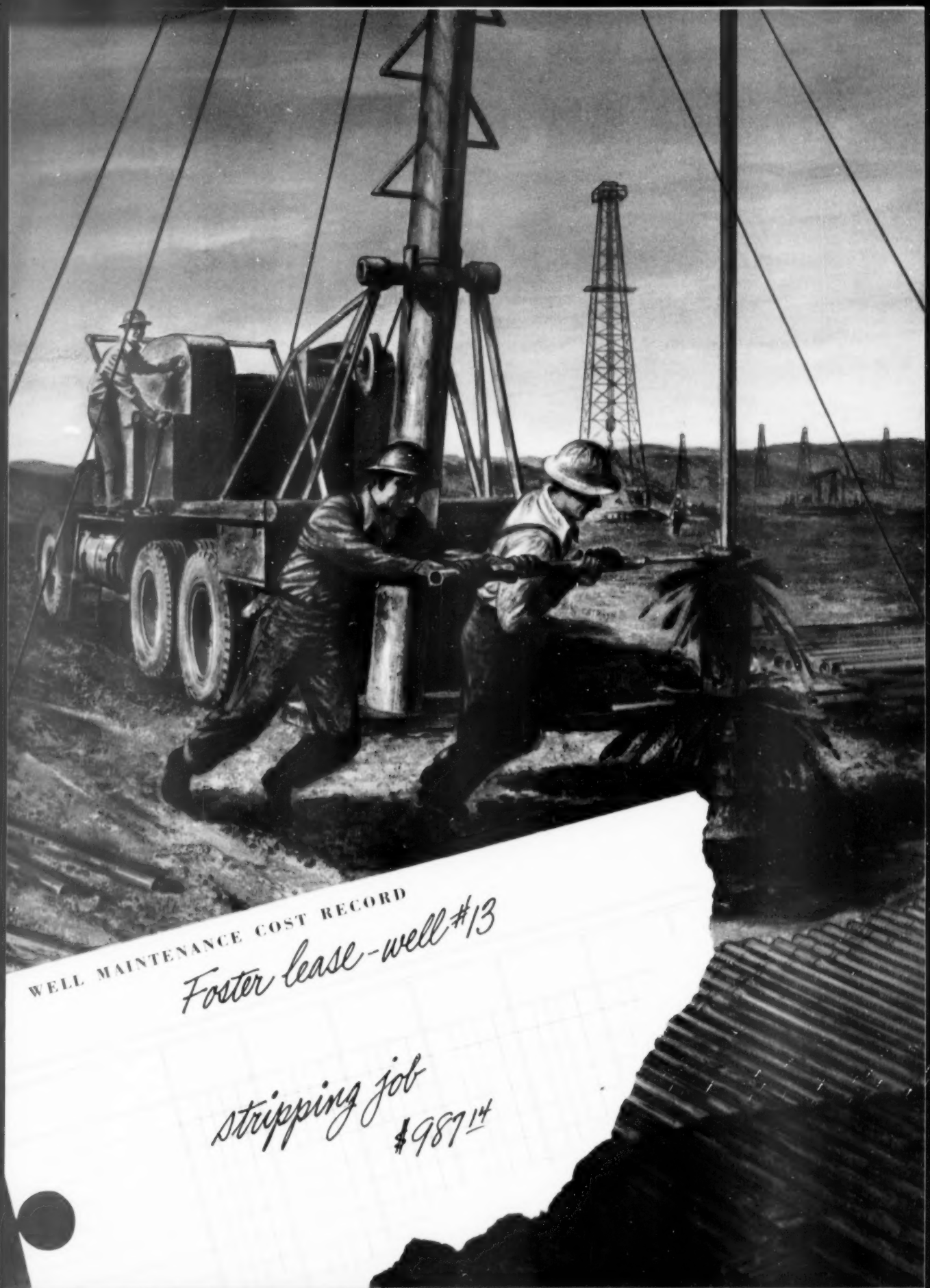
The Model "W" Enardo Clock Shut-Off Valve is designed to control the flow of low-pressure gas or liquid and to shut off the supply at a pre-determined time. It is completely automatic and can be safely used on any gas or liquid flow line where pressures do not exceed 100 lbs. Timing mechanism on the valve can be supplied for either 12 or 24 hour operating cycles. The assembly consists of a stainless steel trimmed valve with a cast iron body mounted on a housing containing the valve tripping linkage and clock actuating mechanism. Write for bulletin 10-05.

ENARDO manufacturing company

BOX 1647 • TULSA, OKLAHOMA

Truth in Advertising Builds Confidence.

"TAKING THE PULSE OF THE OIL INDUSTRY"



WELL MAINTENANCE COST RECORD

Foster lease - well #13

stripping job

$987.14

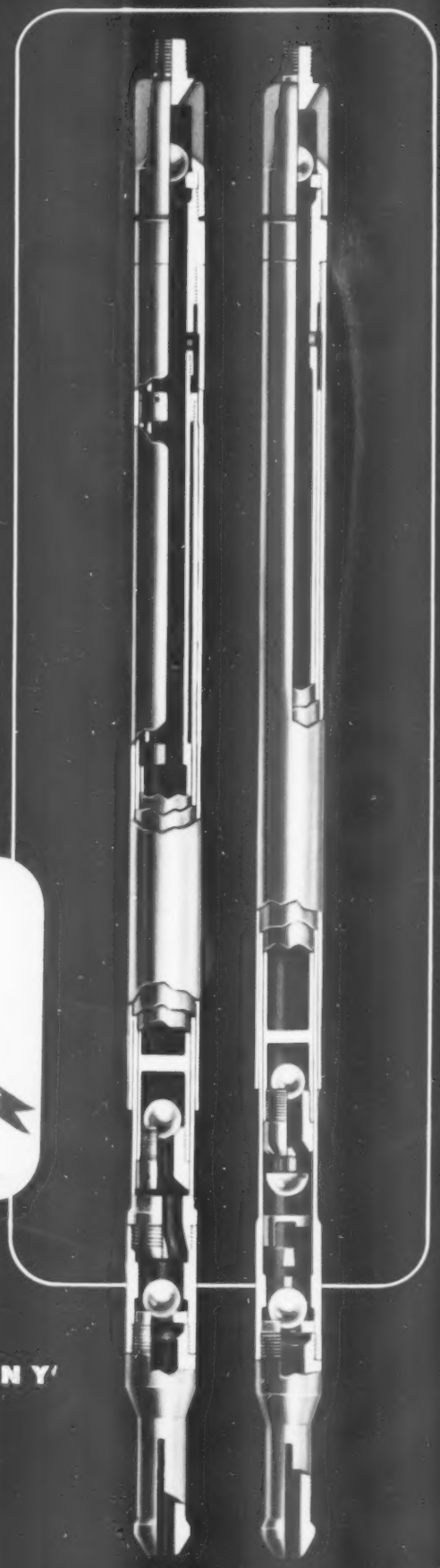
The odds are 100 to 1 that this stripping job could have been prevented with an...

oilmaster

MULTIPLE TUBE FLUID PACKED PUMP

Write for descriptive literature

oilmaster PUMPS
FOREMOST IN THE INDUSTRY



FLUID PACKED PUMP COMPANY

MAIN OFFICE AND PLANT, LOS NIETOS, CALIFORNIA

Distributed by The National Supply Co., Pittsburgh, Pa.

Export: The National Supply Export Corp., 30 Rockefeller Plaza, New York

Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

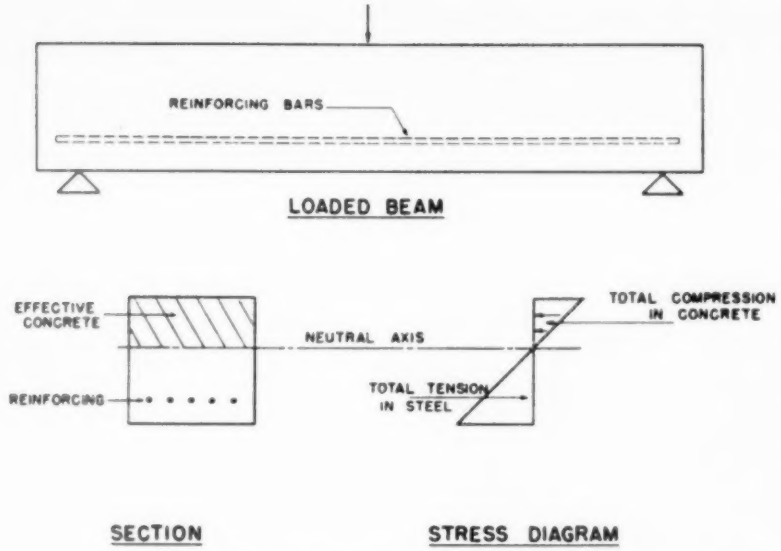


Fig. 1—Simple reinforced concrete beam.

Prestressed Concrete

(Continued from page 78)

stress diagram, note that all the concrete on the tension side of the neutral axis is useless from a design standpoint. It serves only to transmit the tensile stresses to the reinforcing steel, and, of course, it joins the steel and the compressed concrete. In prestressed concrete, as we shall see, all the concrete is stressed and considerable concrete is saved. The second point follows directly from the first. There cannot be stress without deformation so that in order to transmit tension to the steel, the concrete is deformed—and cracks. In conventional concrete design the steel is not permitted to take its full stress capacity because the concrete would crack excessively. Prestressed design, by eliminating this problem, reduces the amount of steel required.

Prestressed concrete . . . In most concrete construction these tension cracks are not troublesome, but as noted, petroleum tankage and lines cannot tolerate even the smallest crack. Fig. 2 shows how a prestressed concrete beam will perform under a similar load. By initially compressing the beam longitudinally, enough compressive stress has been introduced so that, up the the design load, no part of the beam is in tension. Under these conditions no cracks can be formed. Note, too, that the cross-section of the beam has been reduced because there is no material needed in excess of that actually carrying load. In addition, the longitudinal prestress reduces diagonal tension stresses which allows a smaller section.

Design savings . . . The effect of these design savings can be seen in Table 1, which compares concrete and steel requirements for tanks designed by the Preload Corp., Inc., with conventional concrete tanks. In most cases it can be assumed that half of the concrete and two-thirds of the steel required for a reinforced concrete tank and up to 85 per cent of the steel required for a steel tank can be saved through prestressing.

Development . . . In the early stages of development, prestressing faced a serious obstacle. Designers noticed that the concrete in certain structures appeared to lose most of its prestress. This was most apparent in newly built tanks which, when first emptied of their contents, began to crack. These developments were finally isolated to the following factors: creep in the tensioning steel and shrinkage and plastic flow in the concrete.

Recently, methods have been evolved for using both high strength steel wire and steel rods at stresses of up to 140,000 psi. At this design stress nearly 75 per cent of the capacity of the steel can be used to resist external moments.

Construction Methods

It is unfortunate that most prestressed tanks in refinery service today were constructed of the lower grade steels and stressed by turnbuckles. In many cases these tanks have given little better service than conventional concrete tanks due to the loss of compression in the concrete. Prestressed tanks built by the latest methods have largely eliminated these difficulties.

Foundation . . . Fig. 3 shows a typical design for relatively unstable soil con-

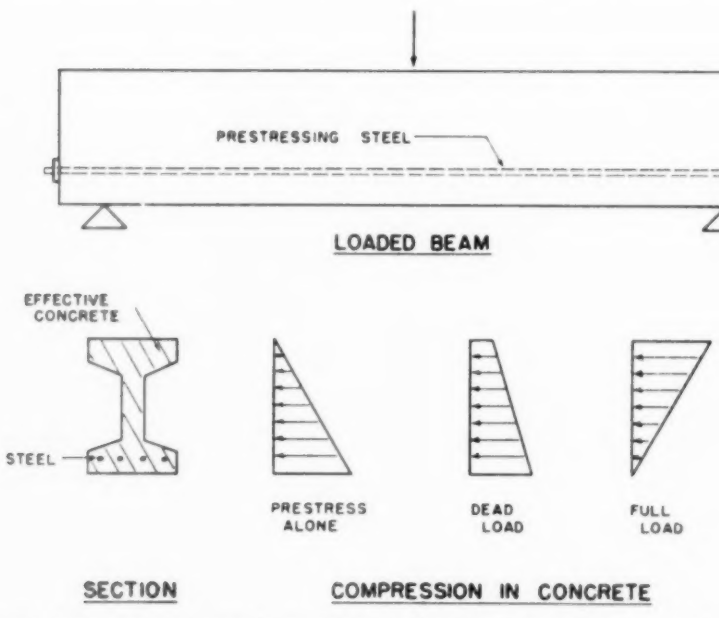
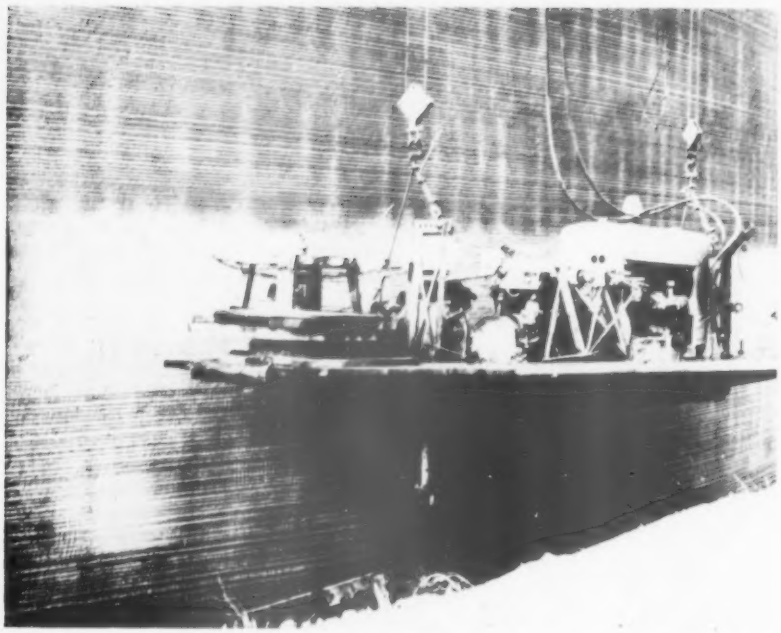


Fig. 2—Prestressed concrete beam. Diagrams show how beam will perform under design load. No part of beam is in tension.

Fig. 3—Typical foundation design for unstable soil conditions.



HORIZONTAL PRESTRESS is applied by winding a wire around cured concrete shell. Self-propelled machine shown here is known as "Merry-go-round."

ditions. Foundations may be either piling or of the ringwall type, as shown. While it is normally not economical to build the foundation wall more than 25 ft. deep, the use of piles requires a more expensive floor. The average floor itself consists of a thin flexible slab enclosed by a ring under the tank shell. The use of this thin floor is possible only if the subgrade is a clay or sandy soil. The floors are usually 2 in. of pneumatic mortar with 0.5 per cent reinforcing steel each way. The joint between shell and floor is a fixed type for small tanks and a sliding type for larger ones in order to reduce moments in the shell.

Shell . . . The shell may be constructed with normal wood forms. However, if the tank is to be in variable stock or light hydrocarbon service, it may be advantageous to use a steel inclave lining as the inner form. This leaves a surface which can be cleaned easily and prevents percolation of light stocks through the concrete.

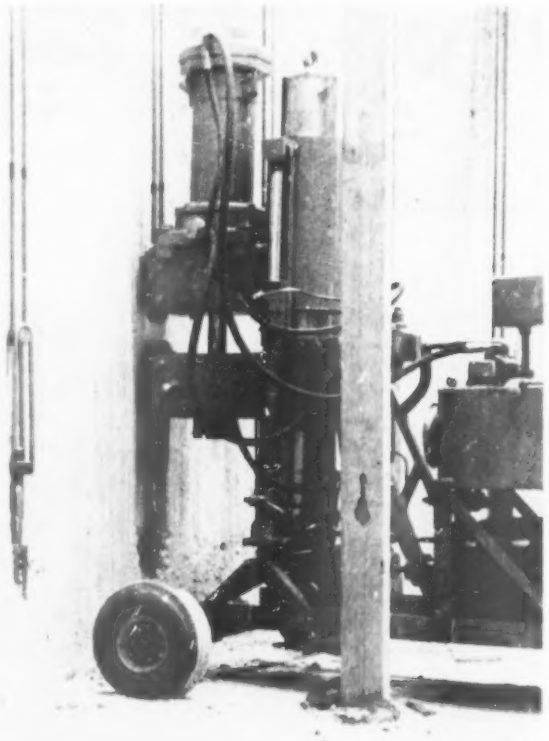
To overcome bursting stresses in the wall by restraint at the base, vertical prestressing is applied to the cured shell. This is done by wires placed in a prepared key by means of hydraulic jack. After the wires are stressed, the keys are filled with mortar and the shell is ready for horizontal prestressing.

Winding operation . . . Horizontal prestress is applied by winding a wire around the cured concrete shell. For wire winding the Preload Corp. has designed a self-propelled machine known as the "Merry-go-round." This machine imparts stress to the wire before wire touches concrete, thus eliminating losses due to friction. The wire is stressed by being passed through a die. Support for the "Merry-go-round" is provided by wheels which travel on the tank rim. Wire can be placed at speeds up to 7 miles per hour and an average 1,000,000-gal. tank can be wound in 2 days. At some points adjacent rings of wire are clamped together to prevent complete loss of the winding in the event that the wire snaps while being placed. Splices are made by a patented device. When the winding operation is finished, the steel is protected from corrosion and injury by a guniting-type operation.

Dome . . . Dome is poured before the "Merry-go-round" applies horizontal prestressing to the shell. Forms for the dome are shown in an accompanying photo on the first page of this article. They consist of a standard wooden rib construction supported by columns. To the left of the picture can be seen wood sheeting which is nailed to the rib construction. These domes are completely unsupported except at the ring. They consist of pneumatic mortar or concrete reinforced with wire mesh. The thickness of the dome can vary from 2 to 6 in. After the dome has been placed and cured the "Merry-go-round" applies the horizontal prestressing to the shell and several rings of wire are wound around the perimeter of the dome. This causes the dome to be compressed and, as evidence of the efficiency of the operation, the dome can actually be seen to rise several inches above its form work.

These domes can be designed to withstand heavy concentrated loads at their center or to take a uniform load of fill above them. There have been instances of nominally designed domes taking the load of a truck accidentally driven across the surface.

Linings . . . The problem of suitable linings for prestressed tanks is twofold: first, contamination of the lighter stocks; and secondly, possible deteriora-



VERTICAL PRESTRESS is applied to cured shell by placing wires in a prepared key. After wires are stressed, keys are filled with mortar.

tion of the concrete itself. Aviation gasoline in particular presents the greatest problem since it contains toluene, xylene, and benzene which will react with free alkali in the concrete.

The U. S. Navy in its specifications for prestressed tanks prepared the following list of linings which it has found satisfactory for the various services: (1) Fuel-oil service—four coats sodium silicate applied by mops, hairbrooms or sprays. (2) Diesel-oil service—an inert resin base enamel applied over a prime coat and covered with a double seal, all applied by spray. (3) Aviation gasoline service—an organic polysulfide applied by spray or in prefabricated sheets. At the present time, the Preload Corp. recommends the inclave steel lining. This can be constructed at a relatively low cost and prevents deterioration of the product and also eliminates percolation through the concrete. Other linings developed to date include various types of vinyl linings which, while they serve the purpose, are generally too expensive to be justified.

While the linings mentioned above, particularly the inclave steel lining, are apparently satisfactory for the storage of light stocks, it appears that more development will be necessary to permit economical storage of these stocks and easy transfer from light to heavy stock service. As the interest in concrete tankage grows, it is to be expected that progress will quicken in the field of linings.

Advantages

In the past 25 years, there have been approximately 700 prestressed concrete tanks constructed, with a total capacity of more than 11,000,000 bbl. These tanks have been used to store many different liquids including crude, gasoline, water, various chemicals, acids, sewage and pulp. These tanks in most instances have performed satisfactorily under many varied conditions.

The advantages, in some detail, are:

1. Material saving . . . During recent years delays in obtaining steel for tankage have often been a matter of months or even years and, therefore, the substitution of prestressed concrete tanks could be of utmost importance. As mentioned earlier, a prestressed tank would normally require only one-fifth of the steel that would be used in a similar steel tank. Regardless of the size of the unit involved, the saving in steel is quite appreciable. Add to this the fact that the special high-strength wire used for both the circumferential and vertical prestressing of tank walls is generally available, and we have a balance heavily in favor of the prestressed tank.

2. Land saving . . . Due to the corrosive nature of steel tankage and to the general fire hazards involved, steel tankage must be spaced at certain intervals. Furthermore, it is very difficult to use steel tankage in underground installations. Prestressed concrete tankage does not follow in this same pattern. Being relatively free from corrosion, the prestressed tanks may be placed at any level suitable for refinery operation. In fact, it is possible to place tanks one upon another to utilize to the fullest extent the land area available for tankage. To date, approximately 50 prestressed concrete tanks have been constructed for underground storage of crude or gasoline. The performance of these tanks has been generally satisfactory.

In regard to aboveground land saving uses, this feature is closely allied with the general fire resistant qualities of prestressed concrete tanks and will be discussed at greater length in the section devoted to the fireproof features of prestressed tanks. It should be emphasized, however, that in refineries where there is a shortage of available storage areas, the use of prestressed concrete tanks could conceivably more than double the available capacity for oil movement and storage.

"In the past 25 years there have been approximately 700 prestressed concrete tanks constructed, with a total capacity of more than 11,000,000 bbl. These tanks have been used to store many different liquids including crude, gasoline, water, various chemicals, acid, sewage and pulp."

3. Shock resistance . . . Approximately 50 prestressed concrete tanks have been constructed in what is normally considered the North American earthquake area. Naturally, these tanks would not be expected to withstand a direct fissure very near or beneath them. However, through adequate design which considers the possibilities of earth tremors, prestressed tanks can be adequately constructed for general use. In addition, these tanks are considerably safer to adjacent tankage in the event of a fire and subsequent explosion. All of this is perhaps more emphasized by the fact that the military are presently considering the construction of a large prestressed tank to test mines. This tank would be normally expected to withstand the shock delivered by the underwater or surface explosions resulting from tests of the mines. Such a tank can be easily designed.

4. Fire resistance . . . Steel tankage, depending upon the type of hydrocarbon storage involved, requires certain spacing of units together with adequate firewall protection. For comparable prestressed concrete tankage, it is believed that similar firewall protection would be necessary, primarily to handle spillage and accompanying fire from interconnecting pipe lines. However, in regard to spacing of units, it is felt that due to the inherent fireproof characteristics of concrete, adjacent tanks might be placed much closer, depending more upon maintenance requirements than upon fire protection requirements. The prestressed tank, being an integral unit should logically be considered as having little effect upon adjacent units. An internal tank fire would certainly not cause sudden and disastrous failure to the wall structure, such as would be expected in steel tanks. True, the wall structure might crack under the intense heat, particularly if water or foam or other firefighting liquids were played upon the exterior wall of the tank itself. However, these cracks would probably be of the hairline variety and while the tank itself might conceivably be ruined, there should be no danger to adjacent units.

5. Maintenance factors . . . From a maintenance standpoint, let us take a practical example. Assume two tanks, one of prestressed concrete and one of nominal steel. Further assume that these tanks of 151,000-bbl. capacity are to be located at the Bayway refinery of the Esso Standard Oil Co., in the center of a critical labor market, low load-bearing soils, high water table and flat terrain. In the case of the steel tank, we will consider the life span to be approximately 30 years, and that for the concrete tank, to be approximately 60 years. (Many users consider a 60-year life span for a prestressed tank to be on the conservative side.) Based upon available figures of cost for comparable tankage in the Bayway area, it is estimated that the steel tank will cost approximately 90 cents a barrel or $136,000. This will include the foundations and the complete tank structure. For the concrete tank the first cost will be approximately $1.20 per barrel or a total of $181,000.

Now applying an interest rate of 4 per cent, let us compare annual costs of the tanks, assuming a salvage value

on the steel tank of $5,000. On this basis the annual cost for the steel tank will roughly equal $7,760. For the concrete tank comparable costs will approximate $8,000 per year. Now consider the annual maintenance factors that are involved in each case. For example, at one refinery annual maintenance costs, including roof and shell repairs, painting and the like, have been equal to approximately $1,500 per tank per year. This is based on 275 petroleum tanks with average capacity of 53,000 bbl. For tanks of 151,000 bbl. in capacity an average maintenance figure of $2,500 would be reasonable. Including maintenance, the total annual cost of the steel tank would therefore be $10,260.

Now let us examine the maintenance features involved in the concrete tank. There would be no corrosion problems and no painting problems and, assuming adequate design and construction, no repairs for cracks. Including all possible incidentals, perhaps $100 per year would be spent for various small maintenance items. However, a conservative estimate of the hydrocarboa storage losses encountered due to disrepair of steel tankage would more than offset this maintenance charge. Summarizing, we find that our final comparison of annual costs indicates that the concrete tank presents a figure of $8,000 as against the steel tank cost of $10,260. This represents approximately a 20 per cent saving in favor of the concrete tank.

In the above example we selected an area where the first cost of steel is well below prestressed concrete tankage. If we had selected the Gulf Coast area for our comparison, the unit price per barrel for the prestressed concrete tank would have dropped to approximately 90 cents. Undoubtedly the price of the steel tank would have dropped somewhat below its Bayway figure of 90 cents per barrel, but the drop would have been much less pronounced. The large drop in cost of the prestressed concrete tank is due primarily to the lower field labor costs in the South. An estimate for the gulf area indicates that the annual cost of capital investment for the steel tank would drop to about $8,900 whereas the comparable cost for the concrete tank would drop to a low of $6,000. This represents a saving of 30 per cent each year.

6. Conservation factors . . . Steel-cone roof tanks today represent a source of considerable evaporation loss to the refinery in addition to contributing to the air pollution problem. The field of evaporation losses from storage tanks was discussed at the thirty-second annual meeting of the American Petroleum Institute and the findings of that group present a challenging picture. Using as an example the 151,000-bbl. steel tank mentioned earlier, let us examine expected losses based on A.P.I. recommended procedures.

Assume that the tank is 150 ft. in diameter, 48 ft. high, painted aluminum, and is used to store gasoline of 8-lb. R.v.p. at an annual average liquid temperature of 70° F. The A.P.I. formula for these conditions indicates an annual breathing loss of 4,600 bbl. At 10 cents per gallon of gasoline, this amounts to $19,300 worth of finished product which each year is lost to the countryside.

The A.P.I. conference further stated that such losses could be all but eliminated by the use of tanks capable of withstanding 2½ to 3 psi. internal pressure. Although this solution is economically unfeasible in steel construction, a prestressed concrete tank of this strength can be built at a cost of about $1.40 per barrel. Such a tank would eliminate 95 per cent of the normal breathing losses and, therefore, save $18,300 per year.

> "... such (evaporation) losses could be all but eliminated by the use of tanks capable of withstanding 2½ to 3 psi. internal pressure . . . a (prestressed concrete) tank would eliminate 95 per cent of normal breathing losses and save $18,300 per year."

Combining this saving with those of decreased maintenance and long life, the economic incentive becomes quite attractive. Again based on 4 per cent interest rate, the annual cost of using the steel tank is approximately $29,500 compared to $9,300 for that of the prestressed tank. The saving in original cost now jumps to about 70 per cent.

7. Use as sphere replacement . . . Steel spheres now represent the only solution to the storage problems encountered with light, high vapor pressure hydrocarbons.

While no installations exist, it is quite feasible that a prestressed concrete design can be adapted to meet these high pressures. The design could conceivably take the form of a horizontal drum with an inverted dome at each end. Preliminary indications are that such construction could be accomplished for $5 to $7 per barrel. This would be a saving of from $3 to $5 per barrel over steel sphere design.

8. Expanded size limitations . . . There is considerable evidence that steel tanks are approaching a size limitation based on present welding methods. While data is understandably difficult to procure, it seems certain that steel tanks should not be built larger than 250 ft. in diameter without new techniques. Concrete tanks, on the contrary, have already been constructed to diameters of 320 ft.

Disadvantages

1. Lack of versatility . . . Once a concrete tank is constructed, it must be considered immovable; it cannot be floated to another site and it cannot be dismantled for use at another site. Its salvage value is negligible.

2. Construction difficulties . . . The evolution of the prestressed concrete tank has been quite rapid, but has been hampered considerably by the technical skill required. In addition, field construction techniques are highly specialized and, therefore, labor problems are critical.

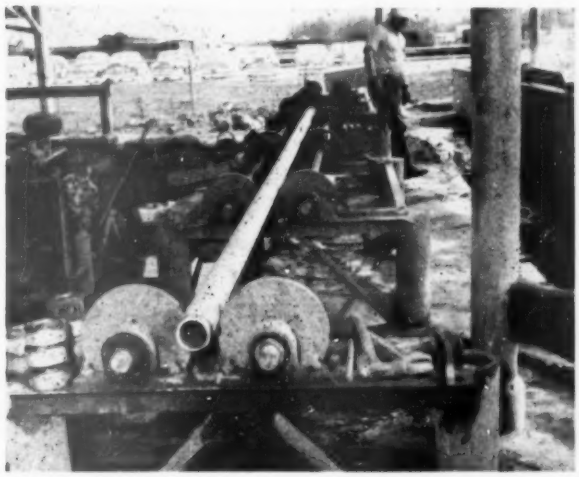
3. Repair difficulties . . . Under normal conditions a prestressed tank should not check. But prestressed tanks have been known to fail. Depending upon the extent of failure, repairs may be difficult to make. Hairline cracks can be reduced or eliminated by lining the tank with certain preparations.

Uses Other Than for Tankage

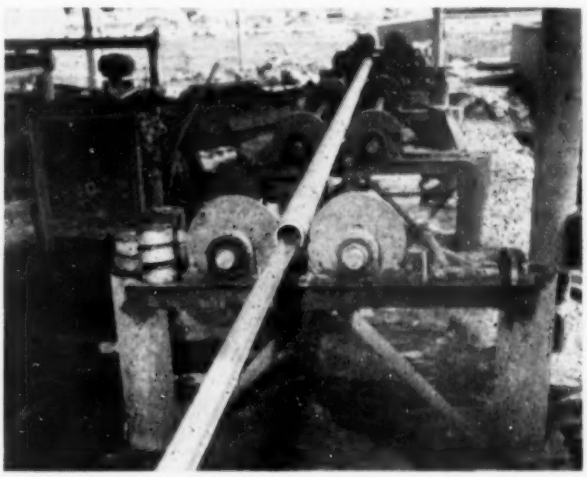
Prestressed concrete has a place in the refinery in applications other than tankage. Warehouses constructed with prestressed concrete beams, provide wide storage areas with additional headroom. This construction has the feature that prestressed structural members may be constructed at one locality, shipped to the site, and erected in place.

A second use is in salt-water circuits and other pipe lines. Prestressed concrete pipe would offer freedom from corrosion and tuberculation. In addition, longitudinal, prestressing materially increases laying lengths of large diameter concrete pipe, reducing construction costs. For example, 2 miles of 84-in. diameter prestressed pipe in 18-ft. sections are already in place.

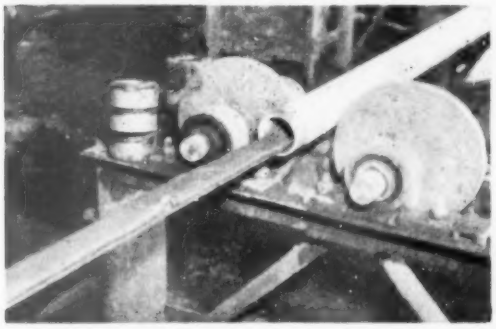
As a general rule, prestressed concrete should be considered for services which demand special strength features, fire protection, or freedom from corrosion. These would include cradles, platforms, utility supports, piling, storage bins, and supports for offshore drilling operations.



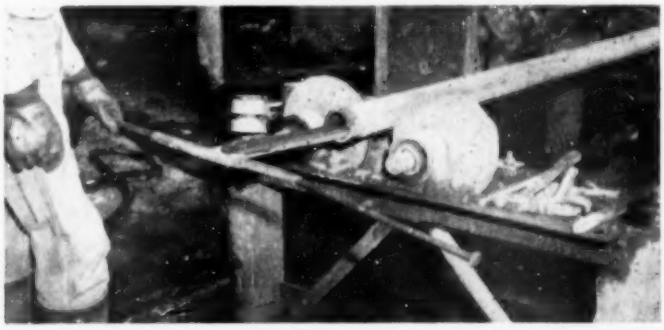
1 Following thorough cleaning in the tank barely seen at right, pipe is placed on rollers to begin the cement-lining process.



2 Angle iron for holding cement is placed so that one end is supported in pipe joint, and is then filled with fresh cement.



3 Cement is placed in angle iron so as to come level with extended arms of angle, thus providing uniform amount of cement in each pipe joint.



4 Once the angle iron has been filled with cement, it is inserted in pipe joint and then upended, so as to deposit cement in pipe. Bar is used to push angle iron into the pipe.

HOW TO

Cement-line pipe for corrosion resistance

by F. Lawrence Resen
Gulf Coast District Editor

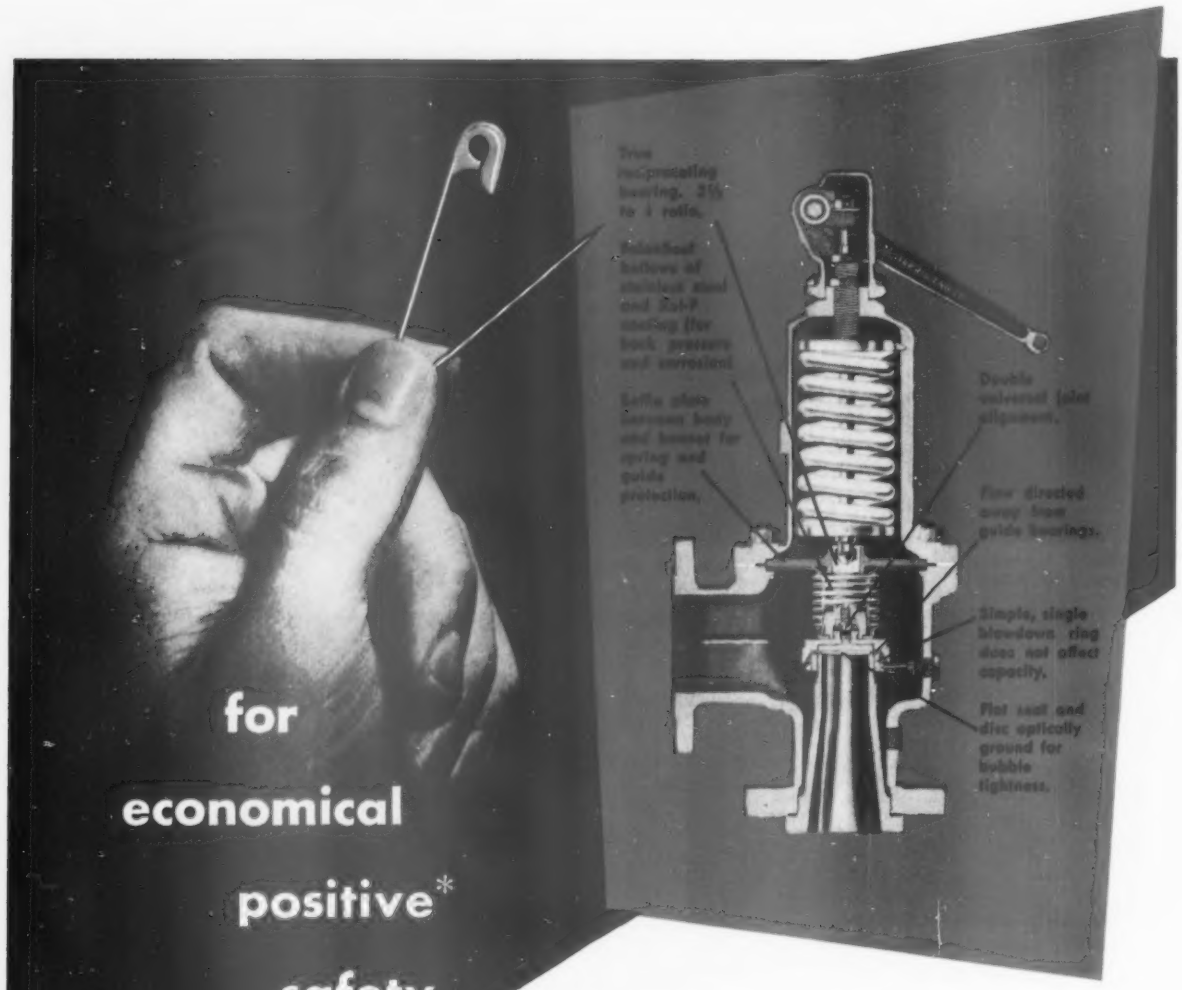
FREEPORT SULPHUR CO.'s problem of handling highly corrosive molten sulfur and water in flow and production lines has been met by the use of an inexpensive cement-lining procedure for protection of piping.

The cement lining has proved so practical that it is being used in water lines as well. It is applicable for most corrosive services and especially those where an excessive amount of piping is involved.

Major equipment required for the cement-lining operations includes a cleaning and rinsing vat, flame cleaner, roller assembly for supporting and rotating the pipe, motor to apply power to the rollers, cement mixer, pipe rack, assorted overhead cranes and trolley, and sheds.

Joints of pipe are first cleaned, then placed on the roller assembly where an angle iron filled with freshly mixed cement is inserted into the pipe and upended to deposit its load on the bottom of the pipe. Power is then applied to the rollers so that the pipe rotates and cement is distributed about the interior of the pipe by means of centrifugal force. Once an even coating has been achieved, the coated pipe is removed to a rack and allowed to cure, after which it may be placed in service.

Freeport has two such plants in use, one at Hoskins Mound, near Freeport, Tex., and the other at Harvey, La., near New Orleans. Although difference in costs will vary according to type of pipe-handling equipment used, whether manually or electrically operated, type of pipe racks and sheds for both line and unlined pipe, etc., a plant such as the one at Hoskins Mound could be constructed at a cost of from $5,000-$7,000 through use of second-



BalanSeal and FarriSeal Safety-Relief Valves

(Pat'd & Pat. Pending)

Farris

ENGINEERING CORPORATION

527 Commercial Avenue

PALISADES PARK, NEW JERSEY

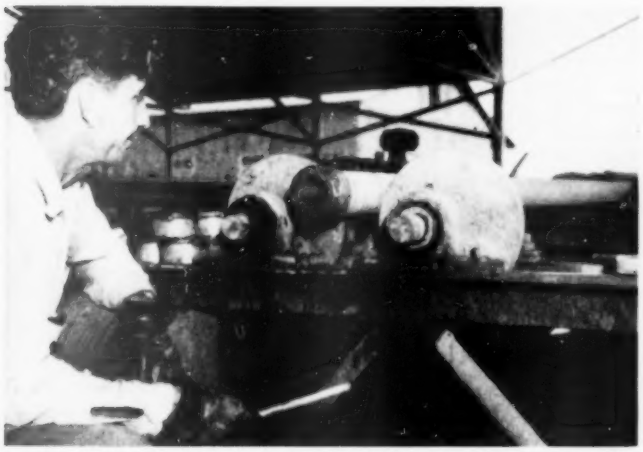
Corrosion and varying back pressure—the two dangerous enemies of positive safety-relief valve operation—are stopped cold by the ingenious construction of Farris valves. Critical working parts are isolated from the lading fluid so that they can't stick, plug or corrode and the special bellows construction nullifies the effect of back-pressure surge. You get positive protection, under all operating conditions. Manufacturing economies offer realistic pricing—and the design permits the use of much smaller discharge piping, at an important saving. So for safety and economy, specify FarriSeal or BalanSeal safety-relief valves. You're never stuck, because they never stick!

Technical manual, 51B, a treatment on Back Pressure Piping and Surge characteristics and 76-page catalog is yours for the asking.

*ASME-N.B. APPROVED
(Certified for Capacity)

Affiliates:

• FARRIS FLEXIBLE VALVE CORPORATION • FARRIS STĀCON CORPORATION • FARRIS HYDROTORQUE CORPORATION
• FARRIS HYDROSEAL CORPORATION • FARRIS PICKERING GOVERNOR CO.



5 Cap is fitted on ends of pipe to prevent cement from coming out. This operator continually inspects pipe to insure that cement coats the entire interior surface.

6 Cement is rotated in pipe while lining crew pound pipe with hammers so as to insure even distribution of the cement within the pipe joint.

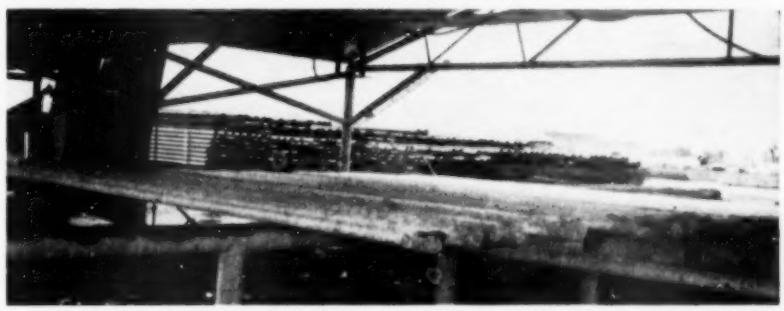
hand equipment, while the somewhat larger installation at Harvey could be constructed at roughly twice the cost.

Nine men are needed to operate the plant. Two of these are night men for drying sand, cleaning pipe, and curing the lined pipe. A crew of seven is required for the actual lining operation and one of these is a working foreman at a premium rate. This crew is able to line 30-35 joints per 8-hour day of 4-in. pipe and 35-40 joints of 3-in. pipe.

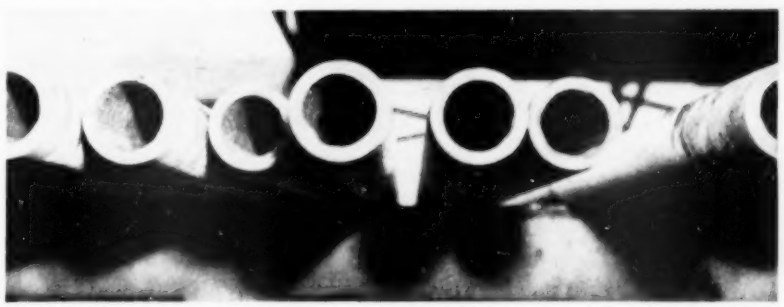
Preparation of the Pipe for Lining

All pipe must be perfectly straight, and clean of oil or grease, large loose rust, and other foreign material which would prevent the lining from distributing evenly on the inner wall of the pipe. It is not necessary to remove all traces of rust and to obtain a bare new metal surface.

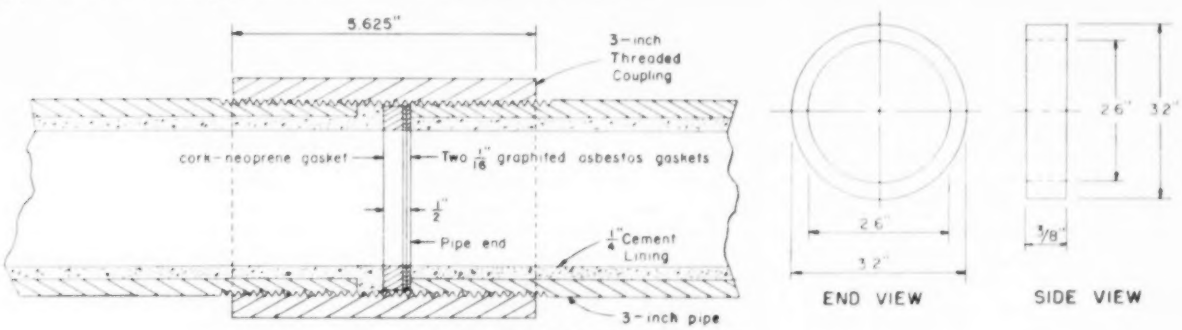
Two methods . . . For the actual cleaning operations two general methods are used: (1) immersion of the pipe in hot detergent cleaners, (2) flame cleaning. The choice depends upon the kind of pipe, size of pipe, and condition of the pipe. For black steel pipe either meth-



7 Cement-lined pipe is placed on this rack where water is sprayed over pipes to permit cement to set gradually.



8 Finished pipe is stored in yard ready to be shipped to location where it is needed. Note the smooth interior finish.



Section through 3-in. pipe at coupling.

od can be used. If the pipe contains only a light film of oil, the hot dip immersion method is probably the most practical since it is faster and consumes only small amounts of materials. If the pipe is covered with a heavy film of oil which would consume considerable amounts of cleaner and time, the flame cleaning method is quicker and more economical. However, on larger sized pipe, considerable fuel would be consumed unless special equipment is employed to insulate the pipe being burned. Consequently, for larger sized pipes, the hot immersion cleaners are probably the choice.

Galvanized pipe must be cleaned of the light film of oil which it obtains in the galvanizing process. For this only the hot immersion process is practical since the pipe cannot be flame cleaned without harming the zinc coating.

If only new pipe is to be lined it is best to specify that the pipe not be given a protective coating at the mill. Then it will contain only the small amounts of oil on the ends from the threading operation.

Cleaning Processes

Immersion . . . Two types of detergent cleaners were used by Freeport: a heavy-duty type containing considerable amounts of free alkali used on the black pipe; and another type with only small amounts of free alkali, so as not to harm the zinc, for the galvanized pipe.

Either cleaner is dissolved in water in the cleaning tank at a concentration of 8-10 oz. per gallon. Concentration is maintained by simple chemical analysis. The solution in the tanks is maintained at a temperature of 180°-190° F. and immersion time is approximately 15 minutes. Heat may be supplied by either steam coils in the bottom of the tank or by the use of coils through which hot combustion gases are passed.

If satisfactory cleaning is not obtained in the time allotted by the assembly-line process, cleaning can be speeded up by either increasing the concentration of the cleaning compounds or by supplying agitation to the cleaning tanks. Alternate lowering and raising of the pipe in and out of the cleaning bath also helps as it removes the depleted solution from the inside of the pipe and brings in fresh solution. Upon removal of the pipe from the cleaning tank it is suspended just above the solution and rinsed off with cool fresh water, allowing this rinse water to run down into the hot tank.

When using the heavy-duty detergent, the cleaning operation must be followed by immersion in 5-6 per cent inhibited HCl to neutralize the alkaline cleaner remaining on the pipe. Cheaper sulfuric acid might be used but remaining traces would adversely affect the setting up of cement.

After the acid wash, the pipe is immersed in a cold-water rinse tank which removes the remaining acid. This tank is equipped with a bottom water inlet on one end and an overflow on the opposite end. Clean water is kept flowing through the tank during working operations to insure constant removal of the acidified wash water. The pipe is left immersed in this tank until it is ready to be placed on the lining machine for application of the mortar lining. When using the milder detergent on galvanized pipe, the acid wash need not be used as this cleaner washes free with water alone. In this case, after rinsing above the hot tank, the pipe is moved directly to the cold-water rinse or wash tank and immersed therein.

As described above, the immersion cleaning process requires three tanks. Tanks used are each 27.5 ft. long by 2 ft. wide by 2 ft. deep. Tanks of this size will accommodate only Range 1 pipe. Only one joint of 12 or 14-in. pipe may be immersed in each tank at a time. However, two joints of 6-in., or three joints of 4-in. may be held in each tank, thus increasing the immersion time allowable for the smaller sizes.

Flame cleaning . . . For the flame-cleaning procedure two air-natural gas burners were constructed in the Hoskins shops. The burner is attached to two parallel 25-ft. lengths of ½-in.-diameter electrical conduit to which are attached flexible rubber hoses, in turn connected to the regulating supply valves. Burning is accomplished by inserting the lighted burners inside the pipe and slowly moving them forward farther into the pipe as the oil and grease are removed in the burned areas, until the burner has gone completely through to the opposite end.

One man can clean from 15 to 20 joints of 6-in. pipe in an 8-hour shift by burning, using only one burner. Two or more burners can be used, however, unless the supply lines for gas and air are quite large, changing the conditions on one burner affects the other. For this reason the men prefer one burner and claim that they can clean more joints per shift using only one than if two are used. They also prefer to burn during darkness because better flame regulation is obtainable due to better examination of flame.

The pipe is burned on the storage rack which precedes the lining plant setup. After each joint is cleaned, it is then rolled on toward the end of the rack where it can be picked up by the conveyor hoist. Pipe that is cleaned by burning is given no further treatment except an immersion in the cold-water wash tank to remove all materials loosened in the burning process, and to cool the pipe just previous to placing the mortar therein.

Preparing the Mortar

Sand used in preparing the mortar should be of high silica and very low lime content. High-silica sand has higher resistance to acid attack. Low lime content is extremely important when using Lumnite cement because free lime accelerates the hardening of the mortar which is undesirable. The sand should contain no grains of larger size than one-half the desired thickness of the lining and not more than 5 per cent should pass a 100-mesh screen. The sand should also be dried.

Freeport's practice is to first pass the wet sand as received through a ¼-in.-mesh screen to remove all the larger grains. The screened sand is then dried in a gas-fired drier. After drying, the sand is again screened through a ⅛-in.-mesh screen. It is then allowed to cool thoroughly before being placed in the storage box.

The cement used is screened through a 16-in.-mesh screen.

All ingredients including water used in preparing the mortar are accurately weighed for each batch prepared. The following are amounts of ingredients necessary for one joint of various sizes of Range 1 pipe using a 1 cement: 1.25 sand by weight mortar.

Size (in.)	Approx. thickness of lining (in.)	Cement (lb.)	Sand (lb.)
4	¼	40	50
6	⅜	64	80
8	⅜	72	90
12	½	120	150

Portland . . . A ratio, by weight, of 1 part cement, 1.25 parts sand, 0.375 parts water was found most satisfactory. The 37.5 per cent water, based on the weight of the cement, is approximate and for best results the mortar should be tested to give a slump of 5½ to 6 in. Ratio of sand may also be raised slightly in pipe sizes above 12-in. i.d. In lining larger sizes of pipe with portland mortars, it is permissible to make more than one batch for use in a single joint. When sufficient batches are prepared, the whole should be mixed thoroughly on a cutting board and then a slump test run. If the mixture does not slump enough, more water may be mixed in and it is then tested again. Mortar remaining from one joint may be used on the succeeding joint.

On the Job . . . Plants

Lumnite . . . A ratio, by weight, of 1 part cement, 1.25 parts sand, 0.32 parts water was found to be most satisfactory. The accurate weighing of all ingredients is very important in the use of Lumnite mortar. All ingredients should be kept as cool as possible. In hot weather, the use of ice water (40°-50° F.) or aluminum chloride at a rate of 0.1 to 1.0 per cent maximum (based on the weight of water) should be used to retard hardening. Do not mix the mortar over 1 to 1½ minutes. It is also necessary to mix the entire batch for one joint of pipe in one mixing. Mortar remaining cannot be used on the succeeding joints.

Lumnite mortars obtain their initial set quickly and for that reason the correct consistency must be obtained on each batch by having the correct amounts of ingredients. There is not time for testing after mixing. Speed is essential in removing the mortar from the mixer, inserting it in the pipe, and spinning the pipe to place the mortar. The whole operation must be done in a matter of 3 or 4 minutes.

Sheds should be provided to keep all the ingredients out of the sun. Also the pipe to be lined should be left in the cool-water tank until it is necessary to place it on the machine. The lining trough should also be kept cool by spraying with water or keeping it under the shed.

The pipe is lowered down over the rollers and the safety cables placed over to prevent the pipe from jumping out during the lining process. The mortar is inserted by use of a trough, which holds per unit of length, the volume of mortar required per unit of length in the pipe being lined. For 4-in. i.d. pipe, a 2½-in. angle iron is the correct size for a trough, and for 6 or 8-in. i.d. pipe, a 3-in. angle iron is suitable. For large sizes of pipe the use of larger angle irons is possible only with the lighter gages of angle iron. At Hoskins a trough of light-gage sheet metal was built, using small angle iron and rods for reinforcing, for use in lining the 12-in. i.d. pipe. The mortar troughs are approximately 23 ft. long for use in lining Range 1 pipe.

Lining operation . . . One end of the trough is inserted into the pipe only a very short distance, say 1 in., or far enough to support itself. Mortar is then poured into the trough, using buckets to carry it from the mixer, while at the same time that part which has been filled is pushed on into the pipe. When the trough has reached the opposite end, it is inverted, and tapped with a hammer to loosen the mortar, so that it will drop into the bottom of the pipe. The trough is then withdrawn in the inverted position. Previous to inserting the mortar, an end flange plate or screw nipple is placed on the end opposite to that into which the trough is inserted. After removal of the trough, the plate or coupling is placed on the other end.

For flanged pipe . . . Flange plates with an opening that gives the desired thickness of lining are used. For threaded and coupled pipe, a nipple with an inside opening diameter to give the desired thickness is screwed into the coupling or box end, and a thread protector with a ring of proper size welded around the inner side, is screwed on the opposite or pin end.

Rotation . . . The pipe is first rotated at a low speed (172 or 331 ft. per minute peripheral) to distribute the cement evenly around the circumference of the pipe. Light tapping of the pipe with hammers to give vibration spreads the cement evenly, especially when using Lumnite. The foregoing procedure is used for 4-in. and 6-in. i.d. pipe. With 8-in. i.d. and larger it is necessary to use a length of 1-in. pipe inserted inside the larger pipe as a trowel to spread out the mortar while slowly rotating the pipe being lined. When the cement has become evenly distributed, the speed of rotation is increased and the pipe is run at high speed (547 for Lumnite and for portland, 1,065 ft. per minute, peripheral) until the lining smooths up and shines, some 10-30 seconds rotation. Rotation is then stopped immediately.

Excessive time of rotation at high speeds is detrimental, as it causes segregation of the ingredients with the water bleeding out on top. Lumnite mortars tend to bleed more readily than do portland mortars. However, if after having rotated the pipe at high speed and smoothed out the lining, small bare or low spots show up which were not noticeable before, these spots may be patched either by hammering or additional mortar as stated above, followed by only slight additional spinning.

The Hoskins lining machine is equipped with an electric motor connected to a variable-speed drive. Two different-sized pulleys are used in the drive shaft also to give two different ranges of speeds on the pipe. With one pulley a range of peripheral speeds of from 172 to 547 ft. per minute are obtained; with the other pulley speeds of 331 to 1,065 ft. per minute are obtained. The Harvey machine uses a gasoline engine for power.

The volume of cement mortar in cubic feet necessary per foot of length for various thicknesses of linings in different-sized pipes is:

Thickness of lining	Nominal inside diameter				
	4 in.	6 in.	8 in.	12 in.	14 in.
⅛	.016	.024	.033	.049	.057
¼	.021	.032	.044	.065	.076
⅜	.026	.039	.054	.081	.095
½	.030	.047		.096	.113
⅝				.112	.131
¾				.127	.149

Curing

Portland curing . . . Immediately after the mortar lining has been placed in the pipe, it is moved to the covered storage racks for curing. The procedures for Lumnite and portland differ slightly. For the proper curing of portland-cement mortars it is only necessary to prevent the loss of moisture from the mortar, and to keep the pipe cool. It is not necessary to add additional moisture. To prevent the loss of moisture the ends of the pipe can either be closed off or the lining itself may be spray coated with a bituminous paint.

The procedure is to cover the ends of the pipe with multiple layers of wet burlap bags, immediately after placing the lining. The pipe is kept cool by spraying with water, employing rotating lawn sprinklers placed in an inverted position above the pipe. The ends are left covered and the spraying is continued until the lining is 36-42 hours old.

Experience has shown that it is very necessary to cure the pipe properly. If the pipe is allowed to get too hot or dry out, shrinkage cracks will occur.

Lumnite curing . . . In curing Lumnite-lined pipe, the ends of the pipe are also covered immediately with wet burlap bags, and the outside sprayed with water. However, the covers are removed at the end of 6-8 hours when the cement has obtained its final set. A simple test for final set is to rub a wet finger over the cement, and if the finger remains clean the cement has set.

When the final set has been obtained, the end covers are removed and the lining is wetted by using a small stream of water while rotating the pipe on the rack. All excess water is drained off. The lining is then kept wet until it is 24 hours old by wetting at approximately 30-minute intervals. Outside spraying of the pipe is also maintained during the curing period.

Acknowledgment

The cooperation of Sam J. Muery, Jr., Freeport Sulphur Co., Freeport, Tex., who supplied the major portion of the data and description used, is hereby acknowledged. Likewise, William T. Spranley, Freeport Sulphur Co., Harvey, La., is acknowledged for demonstrating the operation of the unit.

Get the BEST SERVICE

For your Marquette HYDRAULIC GOVERNORS

At our factory you can get the right kind
of service for your Marquette Governors.
Our trained personnel are skilled in reconditioning,
testing and adjusting Marquette Governors—
carefully . . . expertly . . . intelligently.
We use factory equipment to do the work thoroughly
and speedily, assuring accurate governor performance
at economical costs. May we serve you?

Factory: 1145 Galewood Drive, Cleveland, Ohio
West Coast Governor Station: 4512 San Pablo Avenue, Emeryville, Cal.

The Marquette
METAL PRODUCTS CO.
CLEVELAND 10, OHIO
SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Also Manufacturers of:
ROLLER BEARING TEXTILE SPINDLES
WINDSHIELD WIPERS FOR AIRCRAFT
FUEL OIL PUMPS AND INJECTORS
PRECISION PARTS AND ASSEMBLIES
ROTARY HIGH PRESSURE OIL FIELD PUMPING MACHINERY

Here's a New Turbosupercharger—2

by Rudolph Birmann

THE De Laval turbosupercharger has been designed and developed specifically for high-pressure supercharging service. The Series A model, which has been built in two different sizes—the A-10 and the A-14—is designed for a pressure ratio of 2:1 under full-load engine operating conditions, and slightly higher under engine overload conditions. The later models are being planned to be capable of producing pressure ratios of 3:1 under engine full-load conditions.

Compressor . . . This turbosupercharger incorporates a high efficiency turbine and compressor. The compressor is of the mixed-flow type, so-called because the air enters axially and flows through and out of the impellers partly axially and partly radially. This type of compressor has been improved until today efficiencies and performance characteristics are obtained which are substantially better than those which can be achieved with either the axial-flow type or the radial-flow centrifugal type, the latter being commonly used in conventional turbosuperchargers.

Turbine . . . A departure from conventional practice was also made in the design of the turbine, because it was found that the desired turbine characteristics and high turbine efficiency could not be obtained by using the conventional axial-flow type of turbine. The mixed-flow centripetal turbine was found to be much more suitable for service in exhaust - gas - turbine - driven superchargers.

One of the many attractive features of the centripetal turbine is the fact that its blades are very rugged and that they are few in number. In the axial-flow turbine many more blades are necessary, and therefore they must be comparatively narrow and delicate.

Rotor construction . . . In comparison with all turbosuperchargers presently on the market, the De Laval type is unique with regard to the construction of its rotor. The mixed-flow impeller and the centripetal turbine wheel are combined in a single rotor structure in which the compressor blading is carried on one side of the rotor hub and the turbine blading on the opposite side.

This arrangement eliminates all parasitic losses such as turbine and compressor leakage, windage and friction and nonworking surfaces—losses which are unavoidable in conventional designs employing separate compressor and turbine rotors. By eliminating these losses, the turbine and compressor efficiencies are substantially improved, over and above the improvements already achieved by the aerodynamically highly improved mixed-flow compressor blading and the refined centripetal turbine blade configuration.

This so-called "Monorotor" construction offers the additional advantage of extreme simplicity, eliminating a great number of parts such as air and gas seals and partition walls.

The blades of both the compressor and the turbine are open along their entire tip contour, and their configuration prevents accumulation of dirt, with its resulting loss of performance.

Bearings . . . The overhung rotor is bolted to the end of the shaft by means of a single central tie bolt. The shaft is journaled in two bearings, located on the cold side of the rotor and contained in a common bearing housing that is an integral coaxial part of the compressor inlet casing. Both bearings are of the steel - backed, copper - lead-lined type. The end faces of the outboard bearing serve as thrust bearings by cooperating with thrust collars carried on the shaft, thus serving to locate the rotor and carry its slight axial thrust.

Both bearings are so arranged that they can be removed and inspected in a few minutes, merely by taking off the bearing end cover and without further dismantling the unit. Oil to the bearings can be supplied from the engine lubricating system, or, if desired, a separate, self-contained lubricating system can be furnished with the turbosupercharger.

Vaneless diffuser . . . The mixed-flow compressor has an axial air inlet and a vaneless diffuser, terminating in a scroll housing, from which the air is discharged tangentially. The use of a vaneless diffuser is largely responsible for the wide compressor operating range, and makes the compressor capable of efficiently serving a variety of engines having different airflow requirements.

The turbine nozzle box receives the engine exhaust gases in a tangential direction, through a single inlet, and contains the turbine nozzle guide vanes which provide for full admission in all applications. These guide vanes are arranged between two radial walls, and are so mounted on one of them that they can readily be pivoted to change the nozzle area. This feature eliminates the need for installing different nozzle rings to adapt the unit to different operating conditions, and permits rapid matching of engine and turbosuperchargers.

Guide vane adjustment . . . In some units a mechanism has been incorporated which permits adjusting the guide vane position from the outside, during operation of the turbocharger. This externally adjustable guide vane mechanism is invaluable when used as a tool to rapidly perform a series of tests leading to the best matching of turbosupercharger and engine. It can also be used for varying the turbosupercharger r.p.m. with changing engine load or speed, to achieve various engine operating characteristics, such as high torque at low engine r.p.m.

The guide vanes direct the flow of exhaust gases radially inward into the turbine blades, from where they are discharged into the passages formed by the blades of the turbine wheel. The exhaust gases are then discharged into an exhaust diffuser, which is coaxial with and a part of the turbine housing. This diffuser serves to recover some of the kinetic energy represented by the leaving velocity at the discharge from the turbine blades, and to convey the gases to the turbine discharge opening.

Author is research engineer for De Laval Steam Turbine Co., Trenton, N. J.

Reprinted from an Official Advertisement Published on November 18, 1953

Rubber Producing Facilities Disposal Commission

Invitations for Proposals

Pursuant to the Rubber Producing Facilities Disposal Act of 1953 (P.L. 205, 83d Congress, 1st Session, approved August 7, 1953) the Rubber Producing Facilities Disposal Commission announces that it will receive written proposals for the purchase (or, in certain instances indicated below, the lease) of the properties and facilities described below, hereafter collectively referred to as "the rubber-producing facilities". Such proposals may be submitted at any time beginning November 25, 1953 through May 27, 1954, (unless extended by the Commission upon adequate notice) at the Office of the Commission, 811 Vermont Avenue, Washington 25, D. C. Detailed information concerning the form of proposals and the manner in which they are to be submitted may be obtained from the Secretary of the Commission upon request.

FACILITIES: The facilities offered for sale consist of 13 plants for the manufacture of butadiene-styrene type rubber (GR-S), 2 plants for the manufacture of butyl rubber (GR-I), 1 plant for the manufacture of styrene, 8 plants for the manufacture of butadiene, 1 plant for the manufacture of dodecyl mercaptan, a fleet of 448 pressure tank cars (ICC Classification—ICC-104AW) and miscellaneous items of equipment.

The plants which are in operating condition and which are offered for sale as complete operating units are set forth in the following table.

These plants are operated for the account of the Reconstruction Finance Corporation as units in an integrated synthetic rubber industry. The 13 GR-S plants and the 2 GR-I plants are practically the exclusive domestic sources of these types of rubber. All of the butadiene consumed in the domestic manufacture of synthetic rubber is produced in the butadiene plants offered for sale or lease. The styrene plant produces a significant portion of the total requirements of the synthetic rubber program, the remainder being purchased from commercial sources. Dodecyl mercaptan is an ingredient of one type of GR-S, and the plant offered for sale produces the program's requirements for this chemical.

Detailed descriptive brochures relating to each of the plants may be obtained upon application to the Secretary of the Commission. Similarly, descriptive inventory of the miscellaneous facilities hereby offered for sale will be available.

Plancor No.	*Present Operator*	*Location*	*Maximum Annual Capacity*
BUTADIENE-STYRENE RUBBER (GR-S) PLANTS			
876	Copolymer Corp.	Baton Rouge, La.	49,000 LT
127	Firestone Tire & Rubber Co.	Akron, Ohio	30,000 LT
1056	Firestone Tire & Rubber Co.	Lake Charles, La.	99,600 LT
877	General Tire & Rubber Co.	Baytown, Texas	44,000 LT
983	B. F. Goodrich Co.	Port Neches, Texas	90,000 LT
980	B. F. Goodrich Co.	Institute, W. Va.	122,000 LT†
126	Goodyear Synthetic Rubber Corp.	Akron, Ohio	15,200 LT
956	Goodyear Synthetic Rubber Corp.	Houston, Texas	99,600 LT
1278	Kentucky Synthetic Rubber Corp.	Louisville, Ky.	44,000 LT
611	Midland Rubber Co.	Los Angeles, Calif.	89,000 LT
982	Phillips Chemical Co.	Borger, Texas	66,000 LT
129	U. S. Rubber Co.	Naugatuck, Conn.	22,200 LT
983A	U. S. Rubber Co.	Port Neches, Texas	89,400 LT
BUTYL RUBBER (GR-I) PLANTS			
1082	Humble Oil & Refining Co.	Baytown, Texas	43,000 LT
572	Esso Standard Oil Co.	Baton Rouge, La.	47,000 LT
BUTADIENE PLANTS—PETROLEUM			
706	Cities Service Refining Corp.	Lake Charles, La.	60,000 ST
152	Copolymer Corp.	Baton Rouge, La.	23,000 ST
485	Humble Oil & Refining Co.	Baytown, Texas	49,000 ST
933	Neches Butane Products Co.	Port Neches, Texas	197,000 ST
484	Phillips Chemical Co.	Borger, Texas	71,200 ST
1063	Sinclair Rubber, Inc.	Houston, Texas	78,000 ST
963	Shell Chemical Corp.	Los Angeles, Calif.	61,000 ST‡
1593	Standard Oil Co. of California	El Segundo, Calif.*	
STYRENE PLANT			
929	Dow Chemical Co.	Los Angeles, Calif.	57,000 ST
OTHER FACILITIES			
543	U. S. Rubber Co.	Naugatuck, Conn.	

† This facility is now in stand-by.

‡ Represent a tandem operation whereby Standard Oil Co. of California's production of crude butadiene is transferred to Shell Chemical Corp. for purification along with Shell's crude production.

* This facility is erected upon land held under an assignable lease which expires on February 15, 1958, from Standard Oil Company of California; all other plants are erected on property owned in fee by the government.

In addition to the foregoing, there are offered for sale, or alternatively for lease, 2 plants for the manufacture of butadiene from alcohol, located respectively at Louisville, Kentucky, and Kobuta, Pennsylvania. The plant at Louisville, Kentucky, Plancor 1207, has been operated, and is now being maintained in stand by, by Union Carbide and Carbon Corp. and has an annual capacity of 87,000 short tons. The plant at Kobuta, Pennsylvania, Plancor 483, has been operated, and is now being maintained in stand-by, by the Koppers Company, Inc., and has an annual capacity of 128,000 short tons. These are the only facilities of any sort offered for lease. The Commission will entertain proposals for the leasing of these plants promptly and in advance of consideration of disposal of the other facilities. Such leases may run for not less than 1 nor more than 3 years. Proposals for the purchase of these facilities will be received in the same manner as prescribed for the purchase of the other facilities.

The Rubber Producing Facilities Disposal Act of 1953 prescribes in detail, as well as generally, procedural and substantive standards pursuant to which the sale of these facilities by the Disposal Commission is to be effectuated. To facilitate compliance with these standards the Disposal Commission has prepared Instructions for the Submission of Proposals, which set forth the requirements of the Commission with respect to such proposals, and copies thereof will be available upon application to the Secretary of the Commission. Subject to the foregoing, the following additional information concerning the program of sale is announced:

CONTINUED OPERATION OF PLANTS: As a condition to sale, the Commission is required to be satisfied that the prospective purchaser actually intends to operate the facility or facilities for the purpose of manufacturing synthetic rubber or its component materials. The purchaser must also agree to comply with the terms of a "National Security Clause", having terms, conditions, restrictions and reservations which will assure the prompt availability of the facilities, or facilities of equivalent capacity, for the production of synthetic rubber and the component materials thereof for a period of 10 years from the date of the contract. In consonance with these requirements, while the Commission will entertain proposals for the acquisition of portions of the productive capacity of particular facilities, as further discussed in the Instructions for the Submission of Proposals, it will not entertain proposals for the piece-meal acquisition of individual items of equipment except such items as are listed in the inventory of miscellaneous equipment referred to above.

FINANCING: Proposals for purchase shall provide for the payment of not less than 25% of the purchase price in cash, and the remainder may be financed by a first lien purchase money mortgage maturing in not more than 10 years and providing for periodic amortization (amortization in equal annual instalments is not required). The interest rate upon the balance of the purchase price represented by the mortgage shall be 4% per annum.

Proposals for purchase shall be accompanied by a deposit of cash or United States Government bonds of face amount equal to 2½ per centum of the gross amount proposed to be paid but not exceeding $250,000 for each facility; provided, however, that the deposit required in the case of a proposal for one of a number of facilities on an alternative basis shall be the same as would be required if such proposal were for only the facility for which the highest amount is proposed to be paid. Except in the case of purchasers, deposits shall be refunded without interest. In the case of purchasers, deposits made hereunder shall be applied without interest to the purchase price.

PROCEDURE SUBSEQUENT TO THE SUBMISSION OF PROPOSALS: During a period of 7 months (unless extended by the Commission upon adequate notice to those submitting proposals) following the termination of the period for the receipt of proposals, the Commission will negotiate for the sale of the facilities with those who have submitted proposals. In accordance with the terms of the Act, negotiations for the sale of each type of plant (i.e., GR-S, GR-I, Butadiene, et cetera) will be limited to those persons having submitted a proposal for the purchase of such a type plant. Such negotiations will be conducted with due regard to the several purposes of the Act that the disposal of the synthetic rubber producing facilities establish a free, competitive, synthetic rubber industry, afford small-business enterprises and other users, the opportunity to obtain a fair share of the end products of the facilities sold and at fair prices, be consistent with national security, and realize full fair value for the facility or facilities, taking into consideration the policy set forth in Section 2 of the Act.

For further information and details apply to Ferris B. Thomas, Secretary.

Holman D. Pettibone,
Leslie R. Rounds,
Everett R. Cook,
Commissioners

November 18, 1953

RUBBER PRODUCING FACILITIES DISPOSAL COMMISSION
811 Vermont Avenue, N.W.
Washington 25, D. C.

Underground Corrosion

New Techniques in Control

by O. C. Mudd

THE present trend of using relatively thin-wall pipe, particularly in lines of large diameter, increases the importance of corrosion control to protect these important investments and reduce liability of future damages, loss of revenue, and possible replacement costs.

Cathodic protection is generally recognized as an effective component in a balanced program of underground pipe-line conservation; however, the increasing adoption and extension of this method of corrosion control on pipe lines and other underground structures increases the complexity of existing problems.

Pipe coating, which is usually considered to be the primary component in corrosion-mitigation programs, needs improvement in materials and physical properties, also in application and subsequent treatment if it is to keep pace with the general advancement in larger-diameter-line materials, design, and construction.

Some practices associated with pipe-line construction and operation can be revised to obtain better results and improved economy from present methods of underground corrosion control without incurring any offsetting disadvantages.

Anodic Metal for Electrical Grounds

Recognized safety regulations or applicable codes require one or more electrical ground beds with connections to all electrical equipment and associated metallic structures.

These ground beds generally are constructed by driving a number of copper-clad steel ground rods into the soil. Interconnections between rods and equipment are usually made with stranded copper of No. 4 B.&S. gage or larger.

This bare copper in the soil when interconnected through machines or piping to any buried iron or galvanized material establishes a continuous operating electrical battery or, more specifically a "galvanic cell." In such a cell the copper surface is the cathode which suffers little or no corrosion while the iron or zinc as anode surfaces are consumed in sustaining current flow.

Substitutions of zinc rods or other metals of equivalent characteristics in lieu of copper-clad rods will reverse the galvanic cell action with respect to bare iron and be at or near electrical equality with galvanized material. Benefits from this reversal can be improved if the exposed copper surfaces of the interconnecting conductors are avoided by installing conductors with moderate insulation, such as vinyl plastic.

This substitution of zinc for copper as grounding rods and the addition of insulation to interconnecting ground conductors has additional advantages where cathodic protection by impressed current is involved.

Impressed current flow from soil to zinc normally starts about 0.3 volt above the potential required to cause flow from soil to iron thus allowing establishment of satisfactory protection on iron surfaces before starting flow to the zinc surface.

Current normally flows from soil to copper surfaces before flowing to iron and the potential between soil and copper surfaces normally must exceed 0.55 volt before starting current flow to iron surfaces in the vicinity. By the time satisfactory protection is established on iron surfaces, the potential between soil and copper in the proximity will usually exceed 0.85 volt thus increasing the unneeded current flow to the copper. Current densities exceeding 2 ma. per sq. ft. of copper surface have been observed where iron pipe in the proximity was under protection. Thus eliminating copper grounding rods and insulating interconnecting copper grounding cables prevents undesired current flow to those surfaces.

Each ⅝-in. ground rod 8 ft. long has more than 1 sq. ft. of area and 13.5 ft. of No. 4 or 11.75 ft. of No. 2 stranded conductor has 1 sq. ft. of soil contact area. A proposed layout of zinc rod ground bed is illustrated in Fig. 1.

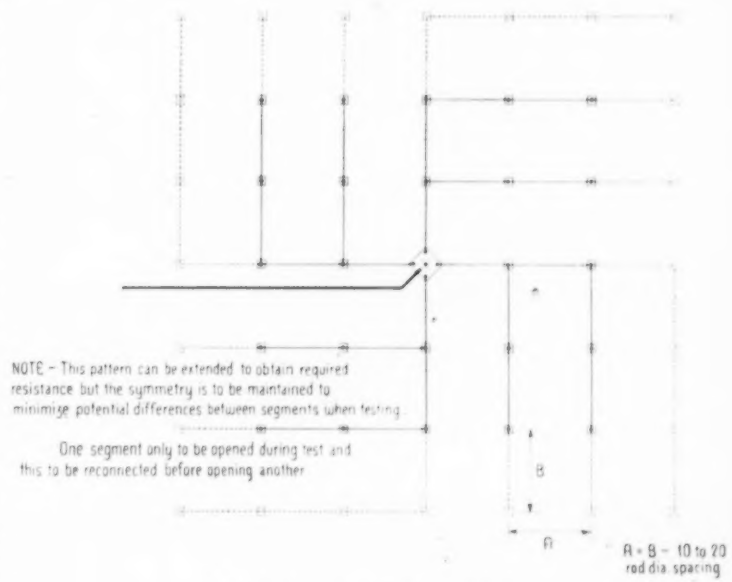

NOTE – This pattern can be extended to obtain required resistance but the symmetry is to be maintained to minimise potential differences between segments when testing
One segment only to be opened during test and this to be reconnected before opening another
B
A
A = B – 10 to 20 rod dia. spacing

Fig. 1—Layout plan of ground bed.

Author is senior corrosion engineer, Shell Pipe Line Corp., Houston. Paper presented before session on transportation, annual A.P.I. meeting, Chicago, November 10.

LUFKIN'S Latest

CONTRIBUTION TO THE ECONOMICAL AND TROUBLE-FREE PRODUCTION OF OIL

400-600 RPM

45-65 HORSEPOWER

the **NEW H-795**

TWO CYCLE • TWO CYLINDER OIL FIELD GAS ENGINE

featuring

- THERMOSYPHON COOLING
- BUILT IN ELECTRIC OR AIR-GAS STARTER
- PRESSURE LUBRICATION

Lufkin FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

Branch sales and service Houston, Dallas, New York, Tulsa, Los Angeles, Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyoming, Great Bend, Kansas, Effingham, Illinois, Duncan, Oklahoma, Brookhaven, Mississippi

Lufkin Equipment in CANADA is handled by

THE LUFKIN MACHINE CO., LTD., 14321 108th Avenue, Edmonton, Alberta, Canada.

How to Design and Evaluate Absorbers—4

by R. J. Hull and K. Raymond

FOR absorbers operated in the 1,400-2,100-psig. range, the weight ratio of lean oil to intake gas may be much lower than 1.0. At such low weight ratios the lean oil is not the principal heat-balance quantity, and, as might be expected, no satisfactory correlation could be developed for the temperature rise in the top section of the column. However, on the basis of a limited amount of data, a satisfactory correlation was developed for the temperature difference between rich oil and intake gas. Fig. 4 shows the relation as developed for 1,400-2,100-psig. absorbers.

2. Column Temperature Gradient

Extractions of light hydrocarbons, particularly that of the key component, are known to be temperature sensitive. From a study of a large amount of actual absorber temperature gradient data, it was found that the arithmetic average tray temperature was required for proper evaluation of component extractions. For this reason, correlations of average tray temperature were developed.

Average tray temperature . . . It is desirable to have a good preliminary estimate of the average tray temperature in terms of known quantities in order to speed the calculation procedure. Broadly, although many other factors enter in, the weight ratio of lean oil to intake gas may be used to obtain reasonably average temperature estimates. Fig. 5 shows an average temperature relation which is suitable for first trial calculations. Estimates from this plot should be within 10° F. of the correct average temperature.

A more precise average temperature is required for subsequent calculations. Fig. 6 shows the average temperature relation as a function of top section heat of absorption. This plot should be used in all calculations made after the first trial.

Considering Figs. 3 (Installment 3) and 6, the following may be devel-

Authors with California Research Corp., La Habra, Calif. Paper presented at C.N.G.A. meeting, Los Angeles, October 8-9.

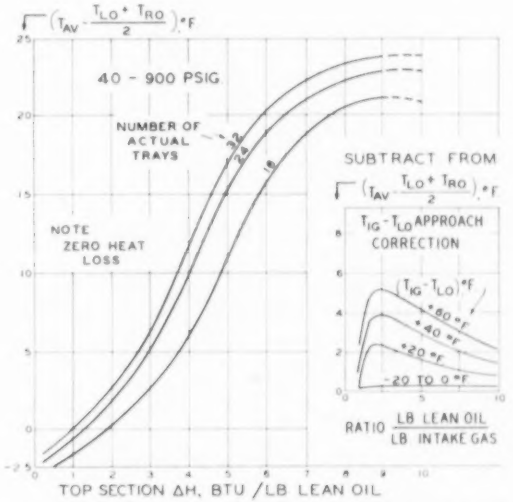

$(T_{AV} - \frac{T_{LO} + T_{RO}}{2})$, °F
40 - 900 PSIG
NUMBER OF ACTUAL TRAYS
32
24
16
NOTE ZERO HEAT LOSS
SUBTRACT FROM $(T_{AV} - \frac{T_{LO} + T_{RO}}{2})$, °F
$T_{IG} - T_{LO}$ APPROACH CORRECTION
$(T_{IG} - T_{LO})$, °F
+60 °F
+40 °F
+20 °F
-20 TO 0 °F
RATIO LB LEAN OIL / LB INTAKE GAS
TOP SECTION ΔH, BTU / LB LEAN OIL

Fig. 6—Average temperature relation as function of top section heat of absorption. Insert gives approximate correction for heat-exchange effect due to differences between inlet gas and oil temperatures.

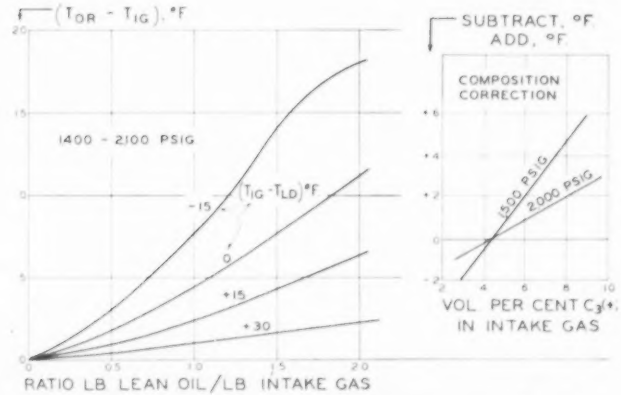


Fig. 4—Relation for temperature difference between rich oil and intake gas.

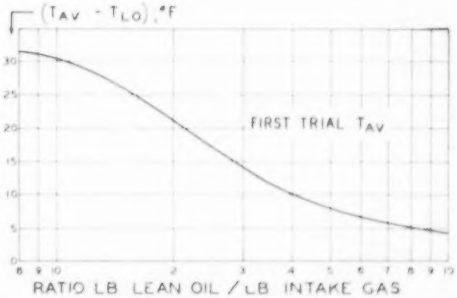
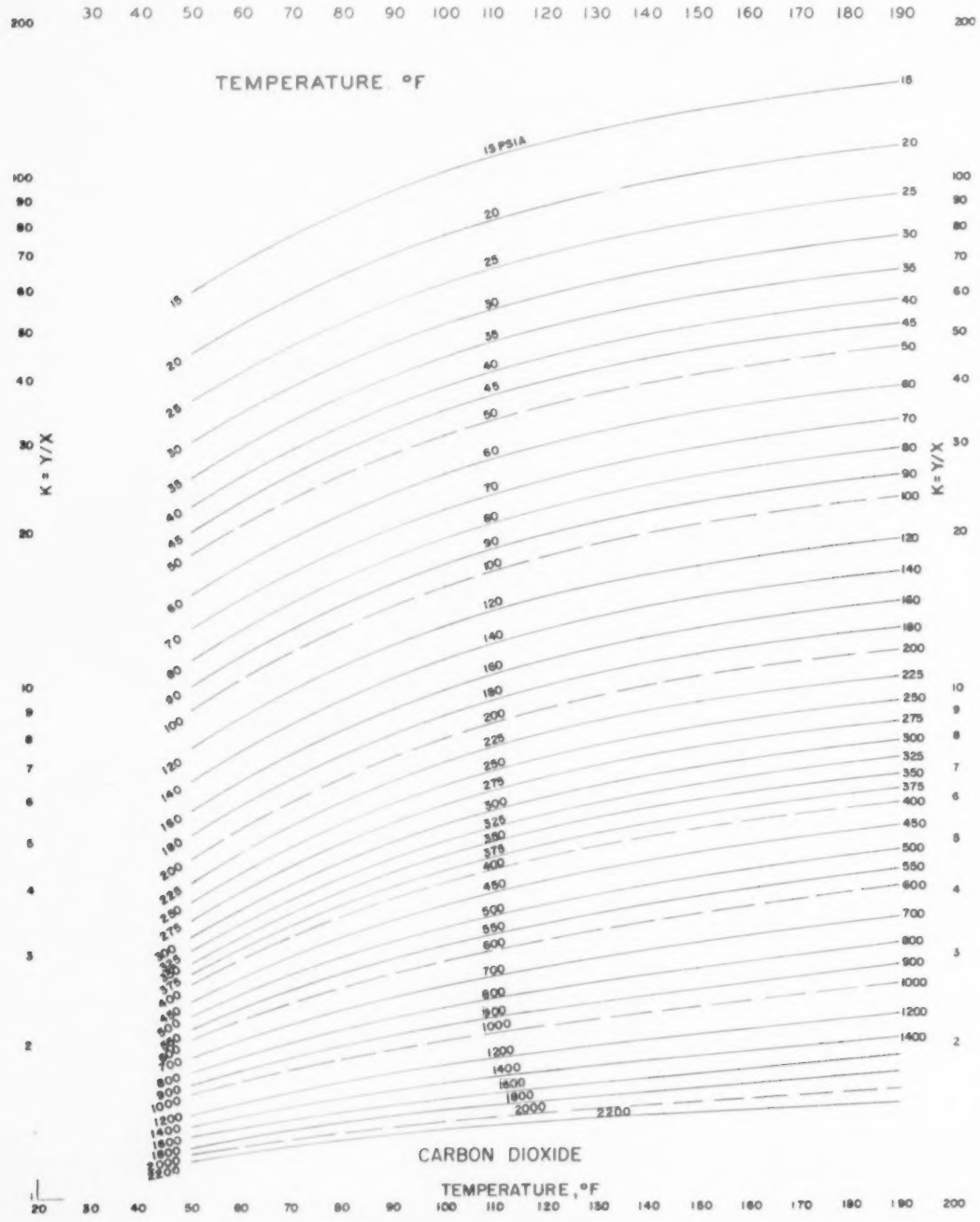


Fig. 5—Average temperature relation suitable for first trial calculation.

oped: (a) For example, from Fig. 3, a 4.0 B.t.u. per pound lean oil, top section or discharge gas temperature is found to be $T_{LO} + 8°$ F. (b) If a straight-line temperature-gradient relationship existed between the top and bottom of the column, $T_{AV} = (T_{LO} + 8 + T_{IG})/2$ or $T_{AV} - (T_{LO} + T_{IG})/2 = 4°$ F. (c) However, from Fig. 6, $T_{AV} - (T_{LO} + T_{IG})/2 = 6°$ to 12° F. depending on the number of actual trays. In effect, Fig. 6 serves to evaluate the observed "bulge" in absorber-temperature gradients.

Correction . . . The insert on Fig. 6 gives an approximate correction for a heat-exchange effect due to differences between inlet oil and inlet gas temperatures. At lean oil to intake gas weight ratios near 1.0, a relatively hot intake gas increases the temperatures throughout the entire column. The temperature increase is large at the bottom of the column, and fades out as the top of the column is approached. The net effect is a considerably higher average column temperature. At higher lean oil to intake gas weight ratios a relatively steep temperature gradient is produced near the bottom of the absorber with relatively little effect on the over-all average column temperature.



Equilibrium constants for carbon dioxide.

ELECTRIC LOGGING—15

Response of Three-Electrode Device Opposite Beds of Varying Thickness

by R. I. Martin

INSTALLMENT 14 emphasized that the apparent resistivity is related not only to the resistance of the material opposite the pickup electrodes but also to that of a relatively large volume of material surrounding the current electrode, and the pickup electrodes.

In practice the effects of the drilling mud in the bore hole and of the finite distance of the pickup span are to give the log a more rounded appearance, although the triangular shape, and the low resistivity, for the length of the electrode spacing below the upper boundary, can be recognized. Both of these features are characteristic of the three-electrode curve opposite thick beds.

Fig. 1 shows the type of curve which is obtained opposite a bed whose thickness is equal to the electrode spacing and in another case where the bed is thinner. The thicknesses are 18 ft. and 4 ft. respectively.

In the case of the bed of critical thickness the maximum apparent resistivity is comparatively low, and is in fact the lowest which may be recorded with this device. The peak is asymmetrical, but is no longer triangular.

In the case of the thinner bed, two features should be noted:

1. The apparent resistivity though less than the true resistivity is appreciably greater than in the case of the bed of critical thickness. This is in contrast to the behavior of the two-electrode device where such an increase is too small to be recognized easily. This discriminatory property of the three-electrode device is particularly useful when evaluating thin beds which may appear to have a low resistivity when logged with the long normal because their thickness is equal to, or less than, the critical thickness for the latter device.

2. The low flat resistivity for a distance below the bed, equal to the electrode spacing minus the bed thickness, is known as a blind zone. It is caused by the screening effect of the bed when the electrodes are separated by it. This blind zone is not completely unresponsive in practice, although its presence may be disturbing. An illustration of this will be given later.

Author is assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

Below the blind zone a resistive peak appears when the current electrode enters the bed and reaches a maximum when the current electrode is at the lower boundary. The peak on the log is entirely due to the disturbing effect of the bed, and does not correspond to any change in lithology opposite the pickup electrodes. It is known as a reflection peak, and should be recognized as such if misinterpretation is to be avoided.

Notes on Fig. 2:

A shows the case of a bed four times as thick as the electrode spacing. All the features of Fig. 1 of Installment 14, may be noted, but here the apparent resistivity curve does not intersect the line indicating true resistivity at such a sharp angle. If the bed were thicker this angle would decrease further until the curves would coincide for some distance.

B shows a bed with a thickness of 1.14 times the electrode spacing. The curve shows a thin, high resistivity, peak at the base.

C shows a bed of critical thickness. The difference between the computed and experimental curves is evident.

D and E show beds which are one-third, and one-tenth of the electrode spacing respectively. The increase in apparent resistivity with decreasing bed thickness should be noted.

If the resistivity of the bed was greater than is shown in these examples, the averaging effect of the electrode spacing, and the disturbing effect of the bore hole filled with mud will become more pronounced. The same general features will be noted, however.

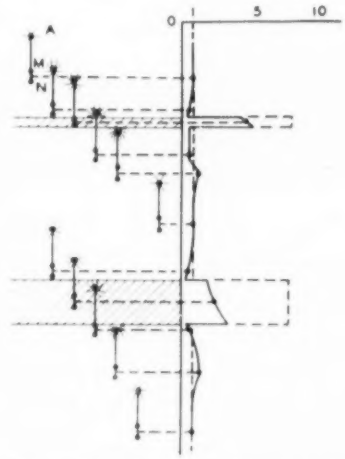


Fig. 1—Response of the three-electrode device opposite thin resistant beds.*

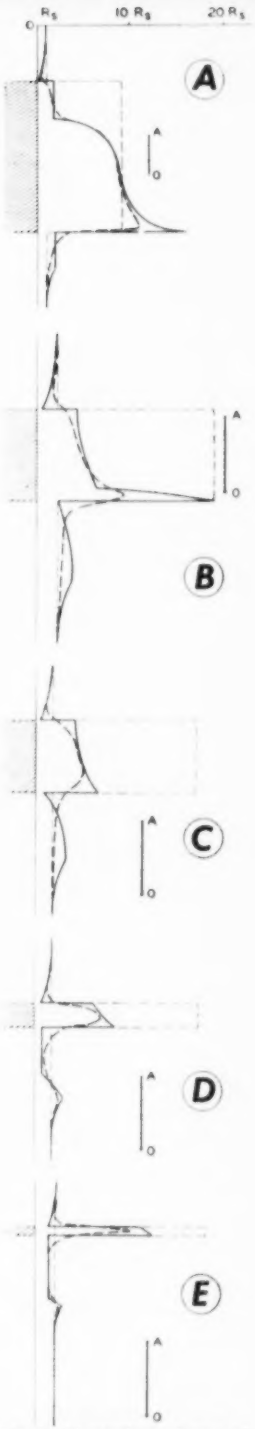
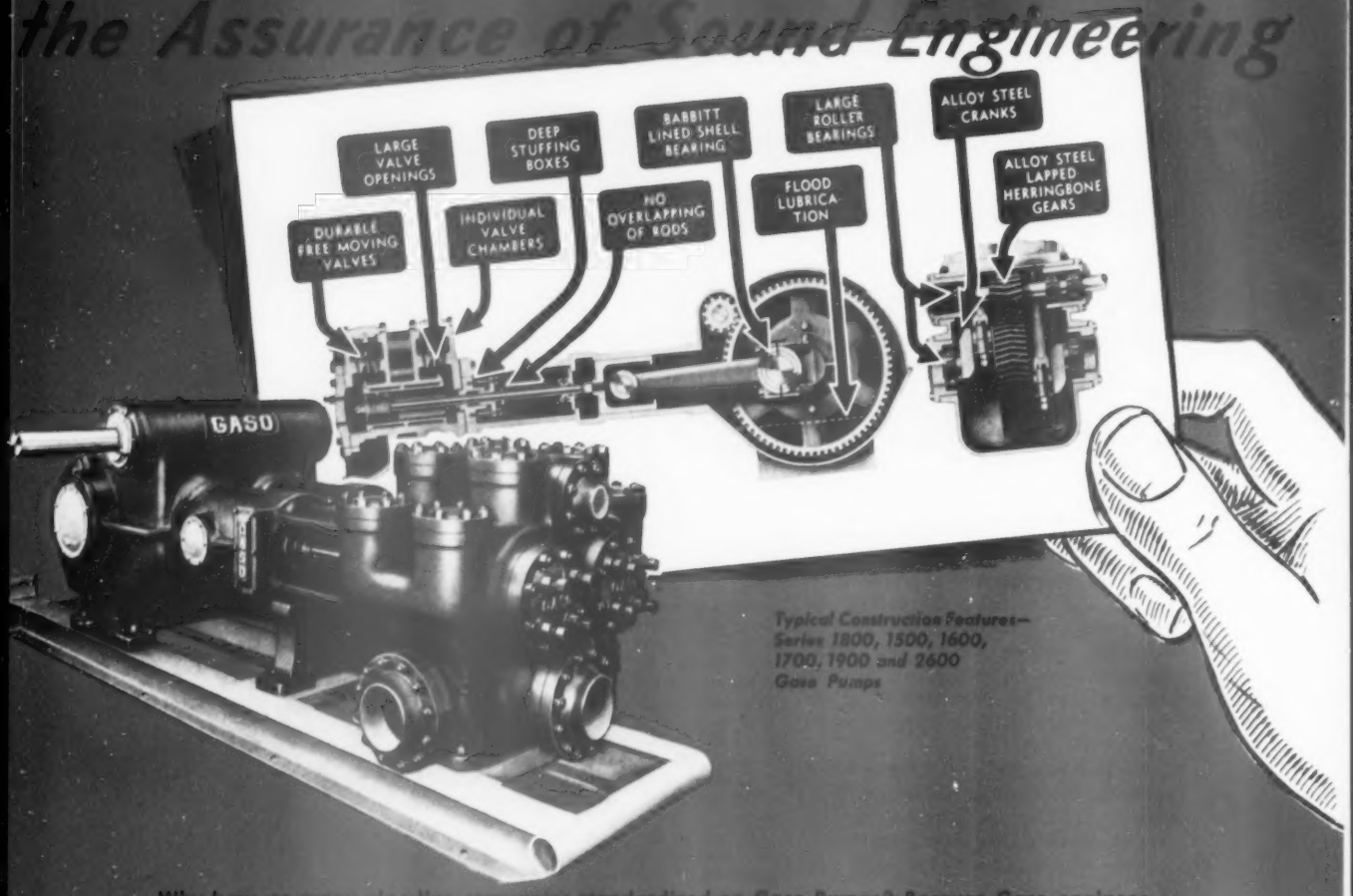


Fig. 2—Illustrations of type of log obtained opposite beds of varying thickness. Electrode spacing is 20 times hole diameter.*

*From "Electric Well Logging," a copyrighted manual by Hubert Guyod.

BACK OF EVERY GASO PUMP

the Assurance of Sound Engineering



Typical Construction Features—Series 1800, 1500, 1600, 1700, 1900 and 2600 Gaso Pumps

Why have so many pipe line companies standardized on Gaso Pumps? Because Gaso engineering, developed and refined through nearly 40 years of specialization, gives pipe line men exactly what they look for in pumping equipment—trouble-free, capacity performance for periods of time that extend far beyond the life expectancy of ordinary mechanical equipment.

GASO PUMP & BURNER MFG. CO.

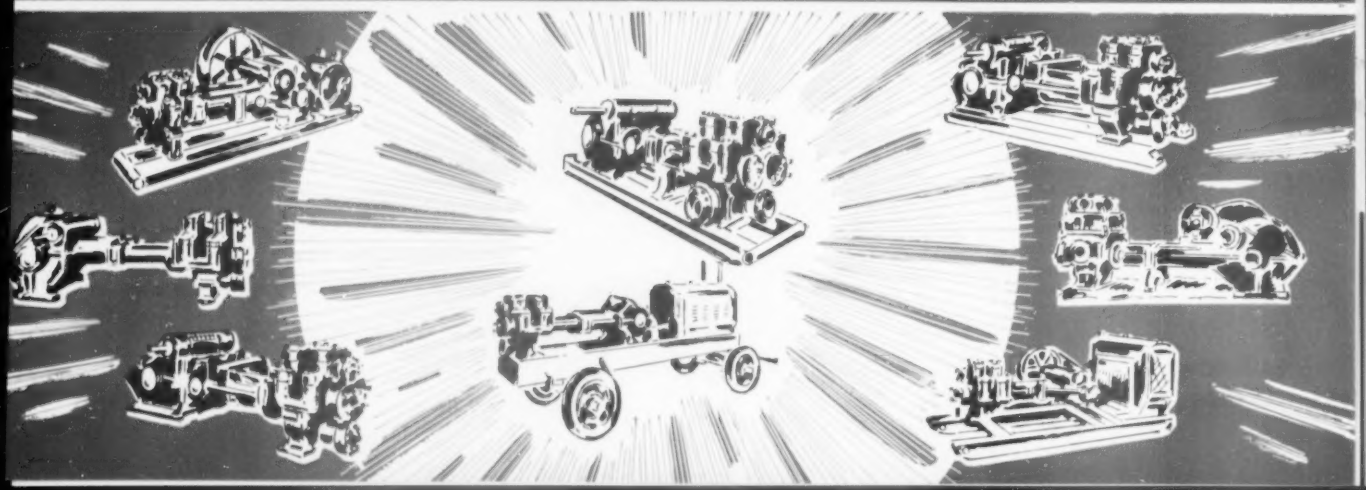
TULSA, OKLAHOMA

EXPORT OFFICE: 149 Broadway, New York

LUFKIN MACHINE CO., Ltd., Edmonton, Alberta
W. L. SOMNER COMPANY, Shreveport, Louisiana
Tinsley, Mississippi • Brookhaven, Mississippi • Odessa, Texas
BUDA ENGINE & EQUIPMENT CO., Los Angeles, Calif.
Long Beach, Calif. • Bakersfield, Calif.
PEDDLERS, INC., Houston, Texas
MORTEX ENGINE & EQUIPMENT CO., Wichita Falls, Texas

GASO PUMPS

for every oil industry need



Control Methods in Boiler Feed-Water Treatment—3

by E. W. Ellis and H. E. Carlson

TRAINED control chemists are on duty 24 hours a day to run analyses on softener effluents and boiler water. In order that these tests be of maximum value, it is of paramount importance that all samples for test be truly representative of the main body of water from which each sample is taken. In order to insure representative samples, equipment must be provided that will make sample taking convenient and practically independent of any variation in sampling technique on the part of those who take the samples. This is accomplished at Cities Service by having constantly flowing streams from each softener effluent and from each boiler through cooling coils to a convenient location for taking the samples. The softener effluent sampling streams are piped to a point immediately above the boiler house laboratory sink and flow into the sink continuously. Sampling streams for boiler water are branched off the continuous blowdown lines and each flows continuously through an individual cooling coil surrounded by flowing cooling water. All samples are obtained by merely holding a container under continuous flowing, cool streams with no valves to open and no lines to flush out. Such samples are much to be preferred over "gage glass" samples or samples obtainable only after flushing a lengthy sampling line, where often there is no cooling coil attached to the sample lines so that flashing occurs, and the person taking the sample is subject to being burned with the hot liquid.

Authors are with Cities Service Oil Co., East Chicago, Ind.

Regular chemical analysis are the basis for controlling the amount of chemicals used in treating the feed water. Table 1 shows control limits and frequency of test for all tests.

It will be noted from Table 1 that tests on each softener are run at 2-hour intervals throughout the 24-hour day. This schedule provides close control on softening operations so that the boiler water need be checked only for total dissolved solids (T.D.S.), for blowdown control.

Hydroxide alkalinity and phosphate tests on the boiler water are, in reality, not necessary except as an additional check to make sure that conditions inside the boilers are satisfactory. Tests for dissolved oxygen in the feed water have been made at infrequent intervals and no oxygen found to be present. Deaeration is complete as long as a strong flow of steam issues from the vent condensers on top of the lime-soda softener.

Analytical methods will be described in the fourth and final installment of this series to be presented in a later issue.

Discussion will cover (1) use of phenolphthalein-methyl purple titration, (2) total hardness test and use of improved Brown microburette, (3) empirical settling test on recirculated sludge from lime-soda softener, (4) colorimetric determination of excess phosphate ion, (5) hydroxide alkalinity in softened feed water, determined by the phenolphthalein-methyl purple titration, and (6) total dissolved solids on boiler water. This discussion of analytical methods includes those methods considered by the authors to be the most accurate and rapid known to the water-treating field.

TABLE 1—CHEMICAL TREATMENT CONTROL

Source of sample—	Test	Test intervals (hours)	Control limits
Lime-soda effluent	P. and M.*	2	Excess lime, 20-40 p.p.m. $CaCO_3$
Lime-soda effluent	P. and M.*	2	Excess soda, 6-14 p.p.m. $CaCO_3$
Lime-soda effluent	Hardness	2	Not controlled
Lime-soda sludge	Settling	2	Approximately 60% minimum
Phosphate effluent	PO_4 ion	2	1 to 5 p.p.m. PO_4
Phosphate effluent	Hardness	2	Under 1 p.p.m. $CaCO_3$
Main boilers	OH ion	8	Not controlled
Main boilers	PO_4 ion	8	Not controlled
Main boilers	T.D.S.	8	Approximately 2,500 p.p.m.
Oil unit boilers	T.D.S.	8	Approximately 2,500 p.p.m.
Organic sludge cond.	Visual	8	Medium dark color
Sodium aluminate	———		10% of weight of dry lime

*Phenolphthalein-methyl purple titration equivalent to the conventional phenolphthalein - methyl orange titration.

EQUIPMENT MEN . . . in the News

Emsco, D+B Sales Group Reorganized

G. H. LEWIS

Reorganization of the Emsco and D+B sales departments to assure closer coordination between machinery and production equipment sales, and between Emsco's sales divisions and its distributors has been announced by William C. Kinder, vice president and general manager, sales.

G. H. Lewis, as sales manager of

L. M. BUSH

T. A. RAMEY

the D+B division of Emsco, will supervise pumping unit sales as well as the sale of all products manufactured by the D+B plant at Garland, Tex.

Lloyd M. Bush, who has filled many sales positions with the D+B division of Emsco during the past 15 years, has been selected to direct all Emsco and D+B sales in California.

To head Emsco's sales for the Mid-Continent area, excluding the D+B division, Kinder has selected T. A. Ramey, who has been associated with manufacturers of drilling and production equipment in various capacities during the past 20 years.

Lewis, who is completing his tenth year with the D+B division of Emsco, has seen the sales personnel grow from approximately 15 to a field staff of 40. Prior to his appointment as California sales manager, Bush had been D+B sales manager for the coast area.

Charles J. McLane, Jr., until recently Emsco's sales representative in Tulsa, has been appointed manager of pumping sales, reporting to Lewis. McLane has been with Emsco since September 1944, starting as a service representative in Shreveport.

T. Clarence Phillips, associated with Emsco since 1934, has been appointed California sales manager for D+B reporting to Bush.

California manager of pumping unit sales will be Robert D. Cassel, who has had extensive industrial sales experience on the West Coast.

Machinery sales for California will continue under the direction of D. A. Carnahan, who has represented Emsco in that capacity since 1950.

Kinder has appointed E. L. Cole as field service manager for the Mid-Continent, reporting to Ramey, and M. A. Simmons as sales engineer for all Emsco machinery. He will report to Kinder.

Otis Pressure Announces Two Branch Openings

Otis Pressure Control, Inc., Dallas, has announced the opening of two new branches, one at Abilene, Tex., and the other at Lindsay, Okla., to better serve the increasing oil production of these areas.

Otis has recently been granted a license by Standard Development Corp. to perform wire line service operations under the new permanent completion method. Field research was conducted by Humble Oil & Refining Co., and the new permanent completion method has proven successful.

Joe Rosson is in charge of the Abilene branch. He transferred from the Odessa division office. In charge of the Lindsay branch is Louie Payne, who transferred from the division office in Oklahoma City.

Digboi Pictures Shown to Los Angeles Nomads

E. V. Corps of Burmah Oil Co. (center) who spoke on and showed sound moving pictures of the Digboi oil fields in Assam at the November meeting of the Los Angeles Chapter of Nomads, looks through the Chapter Roster with Joe Schlarb of Chiksan Co. (left) and Jim Hughes of Lane-Wells Co.

Visco Products Co. Announces Office Expansion

Visco Products Co., Inc., manufacturer of oil-treating compounds, has announced the removal of its general offices from the City National Bank building to enlarged quarters at 2600 Nottingham at Kirby, in Houston.

Headquartered in this new office are C. F. Spangler, vice president, D. M. Jacks, assistant vice president and sales manager, F. E. Cochran, field manager, and C. L. Wallace, Gulf Coast division manager.

Other division offices of Visco serving the petroleum industry are at Oklahoma City where M. P. Hilbun is division manager, and Long Beach, Calif., with W. W. Stewart as division manager.

Keplinger Named President Of Hercules Motors Corp.

J. C. KEPLINGER

At a recent meeting of the board of directors of Hercules Motors Corp., Canton, Ohio, John C. Keplinger was elected president.

Keplinger joined Hercules in 1926 as sales manager. He became vice president in charge of sales in 1931, elected to the board of directors in 1934, and elected executive vice president in 1948.

Charles Balough, new chairman of the board of directors, was one of the organizers of Hercules Motors, founded in 1915. He has been a director of Hercules since its organization in 1923 and president since 1929. Balough succeeds Gardon Mather, now retired.

Other appointments are: Lawrence G. Downey, vice president; George W. La Salle, vice president; F. H. Geisler, director of sales, and Dr. E. A. V. Horiak, chief engineer.

Prior to joining Hercules in 1940 as sales engineer, Downey had many years of experience in the engine business. La Salle joined the engineering department of Hercules in 1928, and has served in various engineering capacities. Geisler joined the sales department of the company in 1931. He was appointed assistant sales manager in 1944 and sales manager in 1931.

Oil Company Official Speaks at PESA Meeting

In attendance at PESA meeting in Los Angeles were: L. T. Wold, Kobe, Inc.; D. S. Grubbs, Oil Well Supply Co.; H. Morehouse, Wagner-Morehouse, Inc.; J. Spalding, National Supply Co.; Otto Hammer, Security Engineering Co.; and J. E. Toussaint, Standard Oil Co. of California.

Also attending the PESA meeting were: Basil Kantzer, Union Oil Co. of California and chairman of Oil Industry Information Committee for the West Coast; Rodney Durkee, Lane-Wells Co.; Ted Sutter, Baker Oil Tools, Inc.; James Hughes, Lane-Wells Co.; and Robert Safford, secretary, Petroleum Equipment Suppliers Association.

Jules Toussaint, vice president and general manager of the producing department, Standard Oil Co. of California, was featured speaker at the Pacific District meeting, Petroleum Equipment Suppliers Association, held October 28 at Los Angeles. Toussaint spoke on how the supply, equipment, and service firms can better cooperate with the oil industry. Stressing the fine spirit which has existed between these two segments of the industry, Toussaint pointed out various ways in which both sides could work more effectively together.

Otto Hammer, president of Security Engineering Co., Inc., and chairman of the Pacific district, presided at the meeting, which included a talk by Ted Sutter, executive vice president of Baker Oil Tools, Inc., and past president of the association, on the need for the organization as an integral part of the industry.

Basil Kantzer, manager of the gas-gasoline department of Union Oil Co., and chairman of the Oil Industry Information Committee for the West Coast, talked to the group on how its members could assist in the work of the OIIC. H. R. Saffer, Jr., executive secretary of the association, reviewed current PESA activities. Rodney Durkee, president, Lane-Wells Co., and vice president of the PESA, gave a talk on why this oil industry should have confidence in the future.

Texas Instruments Acquires Stock of Houston Technical

J. E. Jonsson, president of Texas Instruments, Inc., Dallas, and Sam P. Worden, president of Houston Technical Laboratories, Houston, have announced that negotiations have been completed whereby Texas Instruments will exchange shares of its common stock for 100 per cent of the outstanding stock of Houston Technical Laboratories. Texas Instruments plans to operate the company as a wholly owned subsidiary.

Houston Technical is engaged in the manufacture of gravity meters and optical components. The gravity meter manufactured by it is a very light weight, highly accurate instrument used in oil exploration for reconnaissance surveys and for basic geophysical and geodetic research. The optical components are primarily lens and mirrors for use in the petroleum industry.

Barnett Promoted to Valve Products Manager

O. W. BARNETT

Orville W. Barnett, manager of Nordstrom valve distributor sales for Rockwell Manufacturing Co., has been promoted to valve products manager, L. A. Dixon, Jr., vice president of the firm's meter and valve division, recently announced.

Barnett succeeds Gilbert T. Bowman, former gas and Nordstrom valve products manager, who has been named to the newly created post of manager, product department, supervising activities of all product managers in the meter and valve division.

A 1934 engineering graduate of Oklahoma University, Barnett joined Rockwell that year and has done sales and service work in connection with Nordstrom valves since that time.

Bowman, a 1936 chemistry graduate of University of Detroit, has been with the meter and valve division since 1939. From 1944 until he assumed the gas and Nordstrom valve product managership in 1951, he served as San Francisco district manager.

Bethlehem Supply Co. Promotes Weber, Hood

C. C. Crider, central division sales manager of Bethlehem Supply Co., Tulsa, has announced the promotion of

A. WEBER

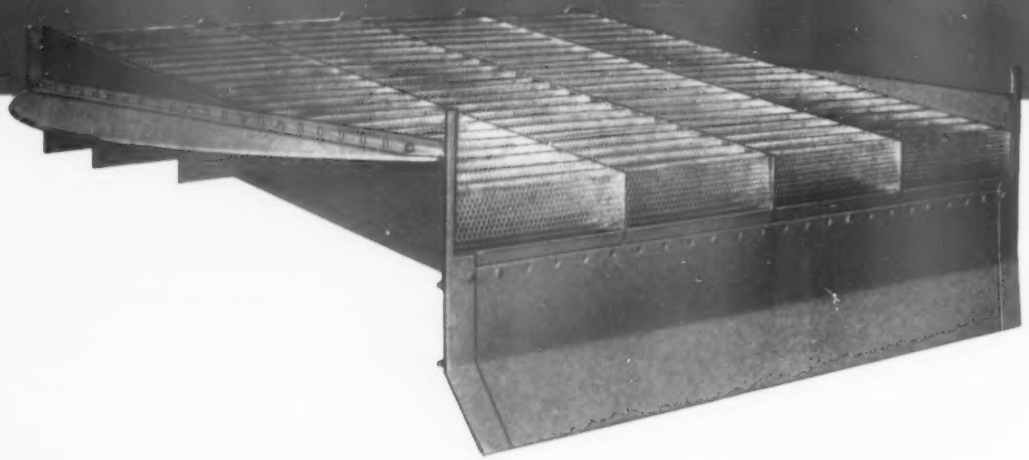
I. E. HOOD

Arthur Weber, Jr., formerly assistant district manager of Bethlehem's West Texas-New Mexico district, to district manager, with headquarters at Midland, Tex. I. E. Hood, formerly Midland city salesman, has been promoted to assistant district manager.

Weber joined Bethlehem shortly after his graduation as a metallurgical engineer from Missouri School of Mines in 1942. In July 1950 he was appointed assistant district manager at Midland, and has held that position since that time.

Before joining Bethlehem in 1944

"Extraordinary Performance Is Routine" with KASKADES



CASE HISTORY No. 1 . . .

One refiner was operating a 7.5' vacuum tower which was limiting capacity and yields due to the pressure drop of existing bubble trays. Capacity desired was:

Vapor . . . . 24,600 #/hr of 0.0137 #/cf density
Liquid . . . . . 36,400 #/hr of 58.3 #/cf density

This refiner replaced the bubble trays with "Benturi" Kaskade trays on the same supports, and is now obtaining a pressure drop of less than 1.0 mm hg pressure drop per tray.

CASE HISTORY No. 2 . . .

An engineering firm recognized a pressure drop problem with a process duty equivalent to:

Vapor . . . . . 35,500 #/hr of 0.26 #/cf density
Liquid . . . . . 965,000 #/hr of 62.4 #/cf density

Yet, multi-pass "Benturi" Kaskade trays in a 7.5' diameter column gave them less than 2.0 mm pressure drop per tray.

Whether your problem is extraordinary or routine, the design flexibility "Benturi" Kaskade tray is probably your answer to greater capacities and higher efficiencies. Wire, write or phone us on its application to your fractionating problem, there's no obligation.

KOCH ENGINEERING COMPANY, INC.

DESIGNERS • MANUFACTURERS • BUILDERS
321 WEST DOUGLAS • WICHITA 2, KANSAS

Eastern and Export
30 Rockefeller Plaza
New York City

Pittsburgh, Pa., Repr.
D. D. Foster Co.
412 Peoples Gas Bldg.

Tulsa, Okla., Repr.
Myers-Segrest Co.
Wright Bldg.

Koch International,
10 Rue Auber,
Paris, France

Hood was for many years active in oil production and drilling in both East and West Texas.

Corrough Is Named General Manager of Operations

H. M. CORROUGH

Hugh M. Corrough has joined Graver Tank & Manufacturing Co., Inc., at its East Chicago, Ind., headquarters as general manager of operations, according to an announcement by E. N. Gosselin, president. Corrough has assumed the direction of Graver's six-plant operations and the supervision of its three divisions, Graver Supply Co., Graver Construction Co., and Graver Water Conditioning Co. Graver's seventh plant is now under construction in California.

Corrough was formerly director of Alco Products Division of American Locomotive Co. in Dunkirk, N. Y. During his 16 years with this company, he had full charge of sales, engineering, and manufacturing as carried on in Alco's large plants at Dunkirk, Beaumont, Tex., and in England. Previously he had been with Cities Service Co. in various managerial-engineering positions in Okmulgee and Tulsa, Okla., and in New York City.

Aldrich Pump Names Harmon Field Representative

Aldrich Pump Co. recently appointed B. G. Harmon of Carmi, Ill., as oil-field representative for the Tri-State area comprising Illinois, Indiana, and western Kentucky. He is a mechanical engineering graduate of Purdue. Harmon has established himself in diamond coring and acoustical well-sounding service as an Aldrich representative who will expand his activities to handle Aldrich pumps primarily for use in water-flooding or disposal. He will carry a full stock of spare parts for Aldrich Direct Flow pumps.

Control Equipment Named Enardo Distributors

Phil Drane, president, Enardo Manufacturing Co., Tulsa, has announced the appointment of Control Equipment, Inc., Odessa, Tex., as exclusive distributors for Enardo in the West Texas counties and the eastern section of New Mexico.

Control Equipment, a division of Sivalls Tank, Inc., will service the area with an entire line of Enardo oil field specialty products. They will maintain a large stock of Enardo vapor control hatches and valves at Odessa, Abilene, Tex., and Hobbs, N. M.

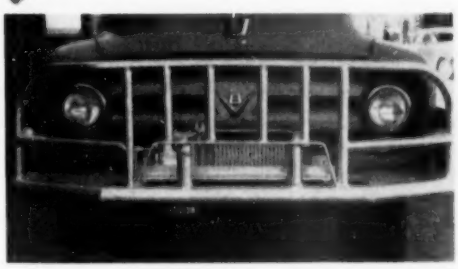
I. W. Lovelady is president of Control Equipment.

Scholl Elected to A-C Board of Directors

Willis G. Scholl, vice president in charge of the tractor division for Allis-Chalmers Manufacturing Co., has been elected to the firm's board of directors, it was recently announced by W. A. Roberts, Allis-Chalmers president.

Scholl was named to his present position in July 1952. Previously he had served as vice president and general sales manager, tractor division. He started with Allis-Chalmers in 1936 as a salesman in the tractor division branch at Columbus, Ohio. He became assistant branch manager of the Toledo branch in 1941 and was named manager 2 years later. From 1947 to 1951, Scholl was eastern territory manager of the division.

BRADEN MODEL MU7-16F FRONT MOUNTED TRUCK WINCH . . . .



NEW in DESIGN NEW in APPEARANCE NEW in PERFORMANCE

You wanted a truck winch that was fast operating as well as safe. This is it. The MU7-16F has a line speed most desirable for winching operations, and it's equipped with BRADEN'S famous OIL-COOLED, AUTOMATIC SAFETY BRAKE . . . the *safest truck winch brake ever produced.*

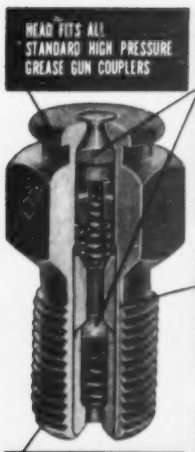
Winch can be installed with or without cutting front end grille of truck. Write for complete information on the NEW MU7-16F today.

- Rating: 15,000 Pounds
- Weight: 234 Pounds
- All Working Parts Enclosed
- Easy to Service
- Fits Any Make Truck
- Low Cost

BRADEN WINCH COMPANY
P. O. Box 547, Broken Arrow, Oklahoma

BRADEN Winches

See WHY
DELTA Grease Fittings for Lubricated Plug Valves
.... DON'T LEAK
.... LAST LONGER
.... WORK BETTER
.... ARE SAFER!


HEAD FITS ALL STANDARD HIGH PRESSURE GREASE GUN COUPLERS
DOUBLE CHECK VALVES
Steel ball-type check valve in body. Piston-type check valve in head makes metal-to-metal seal — no gaskets to leak or wear out and cause valve button to protrude and become damaged or lock coupler on fitting.
ONE-PIECE STEEL BODY
No threads to leak or loosen. No danger of tampering or removing check valves.
15,000 lb. TEST
Type H and type P Fittings are guaranteed not to leak under 15,000 lb. pressure.
CADMIUM PLATED PROTECTIVE FINISH

A DELTA Fitting for ANY Lubricated Plug Valve

3 TYPES—5 SIZES

All Delta Grease Fittings are available in ¼", ⅜", ½", ¾" and 1", with all five sizes in three standard threads, fine, coarse, and pipe thread.

The Rugged DELTA GUN

Develops 10,000 lb. pressure. Heavy barrel tested to 30,000 lbs. Fast, positive prime, handles heaviest lubricants.

Get this CATALOG

Complete information on Delta Fittings, Gun, Automatic Lubricator and DELTA-DESCO Lubricants for any valve service.

DELTA
ENGINEERING SALES CO.
The Only Complete Plug Valve Lubrication Company
804 Louisiana Ave. • Phone 5-2416
SHREVEPORT, LOUISIANA, U.S.A.
Sales Offices in All Principal Cities

Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **Cities Service Pipe Line Co.**—60 miles, 12-in., planned, Houston to Sour Lake, Tex.

R. A. Goodall.—45 miles, 6-in., under way, Little Beaver to Merino, Colo. (To connect with Sterling system).

• **Gulf Refining Co.**—55 miles, 12-in., planned. Bay Marchand to Plaquemines, La.

Gulf Refining Co.—63 miles, 8-10-in., under way, Lea County, New Mexico, to Anderson and Denton fields. 1-54.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned. Midland County, Texas area.

• **Michi, Inc.**—10-in., planned, Highland, Ind. to Kalamazoo, Alma, and Elsie, Mich.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., planned. Snyder to Wink, Tex. 2-1-54.

Phillips Pipe Line Co.—18 miles, under way, gathering lines, northeast area of Andrews County, Texas.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles, Harbor, Calif.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helen to Norwich, Mich.

Service Pipe Line Co.—153 miles, 12-16-in., under way, Tioga-Beaver Lodge area to Mandan, N. D. O. R. Burden Const. Corp. Completion date 12-1-53.

55 miles, 4-6-8-in., under way, Tioga-Beaver Lodge area gathering system. C. P. Bartley & Son.

Sinclair Pipe Line Co.—45 miles, 18-in., under way, Panova to Cushing, Okla. O. R. Burden Const. Corp. Completion date 12-53.

• **Sinclair Pipe Line Co.**—20 miles, 12-16-in., planned, Monee to Blue Island, Ill. Completion date 4-54.

Texas New Mexico Pipe Line Co.—52 miles, 10-in., contracted, Dawson County to Basin System, McVean & Barlow.

Texas Pipe Line Co.—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex. Houston Contracting.

45 miles, 8-10-in., under way, between Erath and Bayou Sale stations. Houston Contracting Co.

65 miles, 4-6-8-12-in., under way, South Louisiana. Panama-Williams.

Golden Meadow to Houma, La. Panama-Williams.

Gathering lines in Leeville, Bay De Chene and Golden Meadow pools. Panama-Williams.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned. Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

Augusta Pipe Line Co.—43 miles, 8-in., under way, from Arkansas City to Augusta, Kans. Ray L. Smith & Son, Inc.

Badger Pipe Line Co.—215 miles, 8-10-12-in., begin Spring '54, East Chicago, Ind., to Madison, Wis. (Joint project of Cities Service Oil Co., Sinclair Pipe Line Co., Pure Oil Co., and The Texas Co.)

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

• **Great Lakes Pipe Line Co.**—Proposed, extension 130 miles, Nebraska City to Grand Island, Neb.

Harbor Products Systems—86 miles, 16-in., under way, Woodbury Junction, Philadelphia to Trembley Point, N. J. Construction Service Co. and H. C. Price Co. (Joint ownership of Sinclair Pipe Line Co., Gulf Refining Co., and Texas Pipe Line Co. Completion date 1-54.

• **International Pipe Line, Inc.**—132 miles, 8-in., proposed, Wrenshall to Minneapolis, Minn.

Oklahoma-Mississippi River Products Line, Inc.—75 miles, 12-in., under way, West Memphis, Ark., to White River. Williams Bros. 12-31-53.

Under way, White River to Allen, Okla. River Const. Co. Completion date 6-30-54.

Under way, Allen to Duncan, Okla. River Constr. Corp. Completion date 6-30-54.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned. Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex.

Standard Oil Co. (Ind.)—243 miles, 10-12-in., under way, Whiting, Ind. to River Rouge, Mich.

Calumet district, Indiana, Morrison Construction Co.

Lake County, Indiana boundary to Colon, Mich., Somerville Construction Co.

Colon to Romulus, Mich. R. B. Potashnick.

Romulus to River Rouge, Mich. R. L. Coolsaet Construction Co.

Sunray Oil Corp.—440 miles, 10-in., contracted. Duncan, Okla., to Mississippi River Ford, Bacon & Davis. Williams Bros.

• **Triangle Pipe Line Co.**—560 miles, proposed, Arkansas City, Ark., to Covington, Ky., and Nashville, Tenn.

U. S. Gov't. Alaskan Products Pipe Line.—600 miles, 8-in., under way, Haines northward through British Columbia and Yukon to Fairbanks, Alaska. Williams Bros., McLaughlin, Inc., and Marwell Const. Co. Completion date 9-55.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.

Memphis, Tenn., to Louisville, Ky.

Louisville, Ky., to Newark, N. J.

Laterals to Paducah and Lexington, Ky.

Williston Basin Pipe Line Co.—250 miles, 8-in., under way, Laurel-Billings, Mont., refineries to Glendive, Mont.

Wolverine Pipe Line System—200 miles, 14-in., under way, Chicago-Toledo-Detroit (Joint ownership of Shell, Texas, and Cities Service.) Anderson Bros. and Midwestern Constructors, Inc. Completion date 1-54.

East Chicago, Ind. to Kalamazoo River, Midwestern Constructors, Inc.

Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 540 miles, 10-in., contracted, Billings, Mont., to Spokane, Wash. 9-54.

Billings to Bozeman, Mont. Ross and Towers.

Bozeman to Helena and on to Clinton, Mont. Associated Pipe Line Contractors, Inc.

Clinton to Perma, Mont. Associated Pipe Line Contractors, Inc.

Clinton to Perma, Mont. Eastern Pipe Line Fields Service Co.

"SCOTCHRAP"

goes on fast by hand or machine

"Scotchrap"—the world's finest polyvinyl chloride film with pressure-sensitive adhesive—is a cinch to apply on T's, fixtures and bends. And it goes on twice as fast with a portable pipe wrapper on straight-line work.

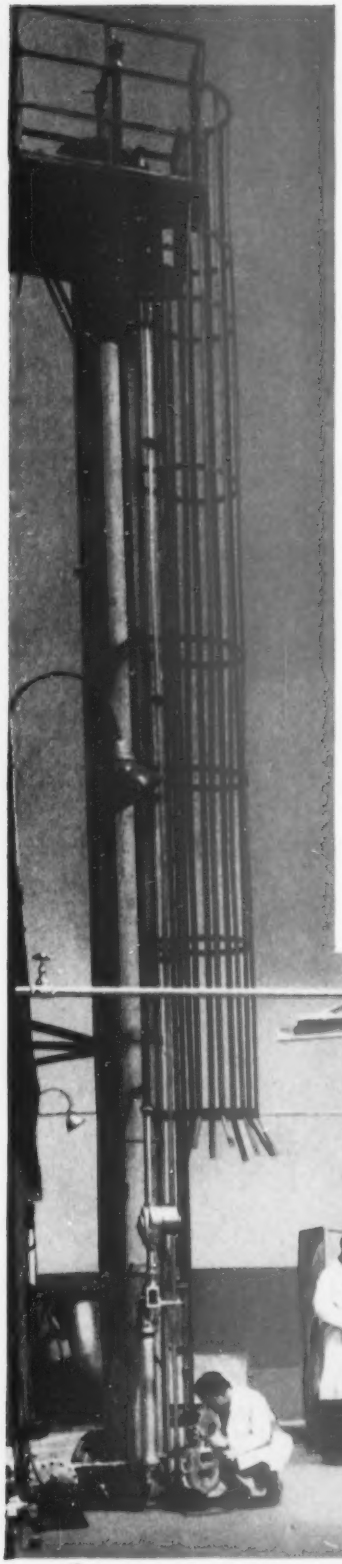
Yet speed and ease of application aren't the only reasons "Scotchrap" is such a favorite! It resists abrasion, galvanic and electrolytic action, corrosion from soil acids, alkalies, moisture and oil. That means long life, trouble-free service.

Try "Scotchrap" and see! It is sold by the square in 1″, 2″, 4″, 6″, 8″ and 12″ standard widths. 10 mil or 20 mil thicknesses for normal or heavy-duty requirements.

For more information on this new pipe-coating method, write Minnesota Mining & Mfg. Co., Dept. OG-113, St. Paul 6, Minnesota. Why not do it *now* —while you're thinking about it.

3M COMPANY

The term "Scotch" and the plaid design are registered trademarks for the more than 300 pressure-sensitive tapes made in U.S.A. by **Minnesota Mining & Mfg. Co., St. Paul 6, Minn.**—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N.Y. In Canada: London, Ont., Can.

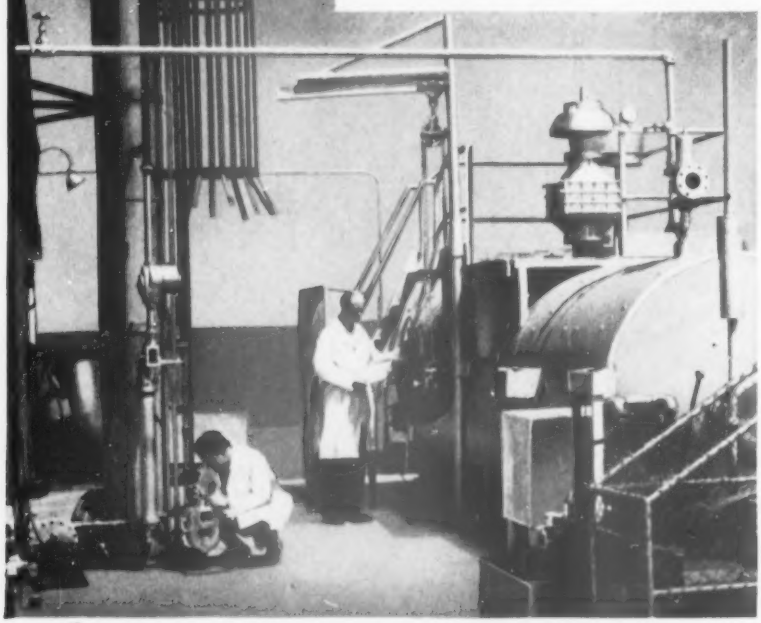


"Varec" meets the Challenge of Obsolescence!

The PETRO-CHEMICAL INDUSTRY is a dynamic one – continuously changing and constantly expanding to boost output and produce better products. This creates a high rate of obsolescence that demands new equipment designs and new material applications for replacements.

Vapor Recovery Systems Company is timing its production to meet this demand. Our Engineering department is continually testing new and better designs, seeking the finer quality parts, and adopting the most corrosive-resistant materials available to contribute to the progress of industry.

Whether you are installing or improving your TANK EQUIPMENT—GAS CONTROL DEVICES—GAUGING SYSTEMS, you'll find the "VAREC" line prepared to do the job in a better way.



"Varec" PROVED AND APPROVED

THE VAPOR RECOVERY SYSTEMS COMPANY
2820 NORTH ALAMEDA STREET • COMPTON, CALIFORNIA
Manufacturers of "VAREC" Equipment
Representatives in Principal Cities of the World

Perma, Mont., to Murray, Idaho. Eastern Pipe Line Field Service Co.

Murray, Idaho to Spokane, Wash. Engrs. Limited Pipe Line Co.

Natural-Gas Pipe Lines

• **America-Louisiana Pipe Line Co.**—1,000 miles, 30-in., proposed, Lowry, La., to Detroit, Mich.

• **Arkansas-Missouri Power Co.** — 140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, proposed, Missouri.

• **Atlantic Seaboard and Virginia Gas Transmission.**—116 miles, 26-in., proposed, loops along Cobb, W. Va., to near Baltimore, Md.

Buzzards Bay Gas Co.—28 miles, 8-in., contracted, Hyannis, Mass., to Bourne Bridge, Mass. Hallen Co., Inc.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chicago District Pipe Line Co.**—31 miles, 24-30-in., proposed, East bank of Des Plaines River southwesterly to near Hodgkins, Ill., on through Cook County to Will County, Illinois.

• **Cities Service Gas Co.**—18 miles, 16-in. Lawrence and Newton counties, Missouri.

69 miles, 20-16-in., planned, Cleveland, McClain, and Garvin counties, Oklahoma

• **City of Fayette, Ala.**—20 miles, 5-in., proposed, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Ala.

City of Dallas, Ga.—8 and 4½-in., distribution system. Engineering & Const. Co., 1954.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954

49 miles, 20-in., proposed, Morton County, Kansas, to near Hooker, Okla.

Colorado Interstate Gas Co. — 70 miles, 20-4-in., under way, gas-gathering system in Kansas Engineering & Const. Co. 1-1-54.

243 miles, 4 to 20-in., under way, Colorado, Oklahoma, Texas, and Kansas. Engineering Const. and Z. J. Graham.

50 miles, 20-in., under way, Hugo to Eads, Colo. R. H. Fulton. Completion date 12-1-53.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

East Tennessee Natural Gas Co.—96 miles, 16-in., under way, Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

54 miles, 4-12-in., under way, laterals off main line from Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

• **El Paso Natural Gas Co.**—1,178 miles, proposed, Permian basin, New Mexico, Texas and Colorado.

El Paso Natural Gas Co.—771 miles, 30-in., under way, Plains, Tex. to Kingman, Ariz.

Section 1—Under way, Plains, Tex., to Corona, N. M. Oklahoma Const. Co.

Section 2—Under way, Corona to Suwanee, N. M. R. H. Fulton.

Section 3—Under way, Suwanee to Gallup, N. M. R. H. Fulton.

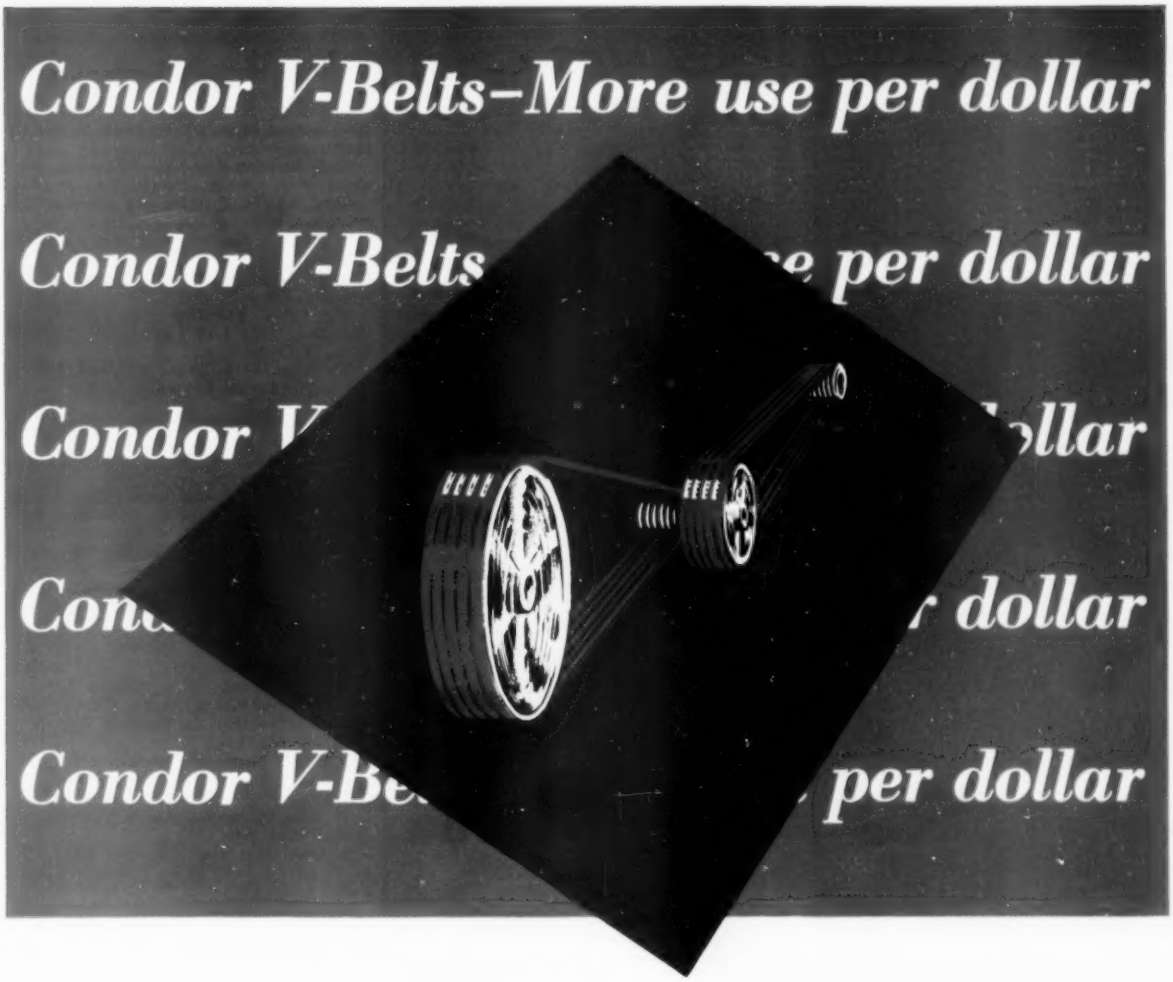
Section 4-5—Under way, edge of Navajo Reservation east to Flagstaff on to Kingman, Ariz. Western Pipe Line Const. Inc. Completion date 2-54.

Under way, across Navajo Reservation connecting sections 3, 4, and 5. El Paso Co. crews.

Under way, Spraberry fields, El Paso Co. crews.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., pro-



SMOOTHEST RUNNING V-BELTS MADE . . . The result—long life and low V-belt drive costs. Correct engineering makes the difference. Sidewalls are *straight* for more grip, less slip, longer life. The pulling section is micro-positioned. Every Condor V-Belt is correctly balanced and destretched during manufacture. This, too, means longer life. Also in special oil-, heat- static-resisting types . . . Get the engineering facts. Ask the R/M Distributor for Bulletin 6868 . . . He'll show how you also can get MORE USE PER DOLLAR with R/M hose, transmission and conveyor belts.

MANHATTAN RUBBER DIVISION – PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

MR 902

The *Purchasing Agent* Has Many HANDS

He's one of the few guys around that's expected to be a crowd of people. Engineer . . . maintenance man . . . superintendent . . . machinist . . . operator. There can be no gaps in the know-how of the purchasing agent, so he recruits his extra hands from the corps of specialists which surround him. His signature on the check is backed by his ability to correlate the experience of many men.

Western Supply Company, manufacturers of heat exchangers for the refining, chemical, petrochemical and pipeline industries, has staked its reputation on the accurate and honest presentation of its equipment to the purchasing agent's advisors. As a result, plant men have come to rely on Western's integrity in the designing and building of all types of heat transfer equipment for all types of heat and pressure services.

Sales are often *made by talking*.

Confidence comes only through *experience*.

Purchasing agents throughout the world turn with *confidence* to Western for all their heat exchanger needs.

TEMA

WESTERN
HEAT EXCHANGERS

Manufactured by
WESTERN SUPPLY COMPANY
P.O. BOX 1888 TULSA, OKLAHOMA

posed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Under way, Rayne, La. to Kincade, Tenn. Houston Contr.

Under way, Gordonsburg, Tenn., to Catlettsburg, Ky. H. C. Price Co.

230 miles, gathering lines, under way, Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned. Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hancock to Sanford, N. M.

Home Gas Co.—46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

Houston Pipe Line Co.—43 miles, 24-in., under way, Edna to Wharton main line. Panama-Williams. 12-15-53.

• **Interstate Power Co.**—26 miles, 8-in., proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Ia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., under way, Washington County to Cedar Rapids, Iowa.

• **Kansas-Nebraska Natural Gas Co.**—41 miles, 10-12-in., proposed, Kansas and Nebraska.

41 miles, proposed, Albion, Arcadia, and Broken Bow, Neb.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

Lone Star Gas Co.—44 miles, 12-in., under way, Red Springs, Woods County to Sulphur Springs area, Hopkins County, Texas.

36 miles, 12-in., under way, Stamford to Abilene, Tex. Company crews. Completion date 12-53.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

• **Mississippi River Fuel Corp.**—109 miles, 10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed. New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **Natural Gas Producer Inc.**—100 miles, 12-in., planned. Yenter pool to Denver, Colo.

Nevada Natural Gas Pipe Line Co.—114 miles, 10¾-in., under way, Topock, Ariz., to Las Vegas, Nev. R. H. Fulton. Completion date 1-1-54.

• **New River Gas Co.**—50 miles, planned. Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **Northeastern Gas Transmission Co.**—22 miles, 8-in., planned, Upton, Mass., to Pawtucket, R. I.

• **Northern Indiana Fuel & Light Co.**—35 miles, 8-in., planned, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—458 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska, Iowa and Minnesota to connect with Permian Basin System.

475 miles, proposed branch lines to Iowa, Nebraska, Minnesota and South Dakota.

• **Northwest Alabama Gas District**—40 miles, 9-in., proposed, Southern Natural's line through Winfield to Haleyville, Ala.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line, planned. Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

129 miles, 31-in, proposed, main-line loops along Topock, Ariz., to Milpitas, Calif. Completion date 11-54.

Pacific Gas & Electric Co.—88 miles, 34-in., under way, portions of 34-in. Topock-Milpitas pipe line. Completion date 4-15-54.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

Permian Basin Pipeline Co.—280 miles, 16-24-26-30-in., under way, West Texas and New Mexico. R. H. Fulton & Co.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

South Carolina Gas & Electric Co.—160 miles, 16-12-10-in., under way, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C. Williams Bros. Completion date 1-54.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

Southern California Gas Co., and Southern Counties Gas Co.—73 miles, 30-in., under way, loops on main line from Blythe to Los Angeles. River Const. Co. 1-54.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., under way, Louisiana, Mississippi, Alabama, and Georgia, and South Carolina. Houston Contracting, Latex and H. C. Price. Fall 1953.

Elmore, Ala., to Tallahassee, Ala. Houston Contr. Completion date 12-1-53.

Gwinville to Pickens. Completion in 1954.

Gwinville, Miss., to Ellerslie, Ga. Completion in 1954.

Sanderville, Ga., lateral. Completion date 12-1-53.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—571 miles, 30-in., planned, Kinder, La., to Portland, Tenn.

67 miles, 30-in., planned, loops in Texas and Louisiana.

63 miles, 26-in., planned, loops in Ohio and Pennsylvania.

58 miles, 20-in., planned, Louisiana Gulf Coast to Station No. 507 near Kinder, La.

100 miles, laterals in Texas.

45 miles, 20-in., proposed, Buffalo, N. Y. to the U. S.-Canadian border Hamburg station near St. Catherines.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

• **Trans-Northwest Gas, Inc.**—246 miles proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **United Gas Fuel Co., and Central Kentucky Natural Gas Co.**—92 miles proposed, Gulf Interstate system, Boyd County, Ky., to Putnam County, West Virginia.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

32 miles, 24-in., proposed, near Ripley,

• Experience pays off in construction efficiency, good work and on-time completion.

HOUSTON CONTRACTING CO. LTD.
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
2707 FERNDALE • HOUSTON 6, TEXAS
GENERAL PARTNERS
LAURENCE H. FAVROT • R. P. GREGORY
ASSOCIATE
GEORGE A. PETERKIN

OCECO
Flame Arrestors
are a
DEPENDABLE
Flame Stop

• These arrestors combine the desired flame stoppage and explosion prevention with minimum pressure drop. Sturdy, rugged semi-steel housings and covers. Corrosion resistant aluminum "banks" have vertical straight through passages, minimizing clogging and simplifying inspection;—extensible for easy cleaning. 2" to 10" sizes. *Write for Bulletin No. 471-R. It gives full details.*

OCECO TANK FITTINGS
THE JOHNSTON & JENNINGS CO.
division of PETTIBONE MULLIKEN CORP.
4751 West Division St. • Chicago 51, Illinois

CUSTOM-BUILT *INDIVIDUALITY* with STURDYBILT prefabricated houses....

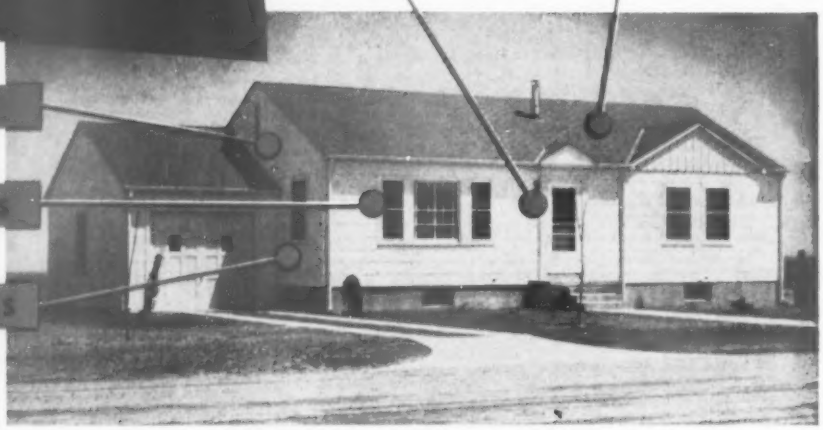
CHOICE OF ROOFING

CHOICE OF ENTRANCES

CHOICE OF SIDING

CHOICE OF WINDOWS

CHOICE OF INTERIORS



STURDYBILT Houses do not all look alike. Even the appearance of models with the same elevation and floor plan can be changed with different type siding, roofing, windows, entrances and interior finish.

MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF CURTIS WOODWORK AND JOHNS-MANVILLE BUILDING MATERIALS

CURTIS Kitchens are now available in STURDYBILT Houses in order to give the family the finest in design and convenience. Any type of roof covering from rolled roofing to Johns-Manville asbestos shingles can be obtained for any STURDYBILT House.

Make your oil field camp a beautiful, planned community. You can do it by taking advantage of the many custom-like features of STURDYBILT Prefabricated Houses.

WRITE FOR INFORMATION

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

W. Va., to Lanham station, Putnam County, W. Va.

60 miles, 30-in., proposed, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Ky.

United Gas Pipe Line Co.—44 miles, 20-in., under way, Lirette field to Harvey, La. Brown & Root.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Co.—54 miles, 4-30-in., planned, Lea County, New Mexico.

25 miles, 3 to 20-in., Garvin County, Oklahoma. Completion date 6-54.

Westcoast Transmission Co., Ltd. — (See foreign natural gas pipe lines).

Foreign Crude-Oil Pipe Lines

• **Arabian American Oil Co.**—18 miles, 22-20-in., planned, Qatif to Ras Tanura No. 3. Completion date 1-55.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products.)

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia, Venezuela.) Completion date 9-54.

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co. — 60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

• **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Anglo-Iranian Oil Co., Ltd.—18½ miles, 16-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

18½ miles, 6-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

15 miles, 12-in., under way, Kwinana to Fremantle. M. W. Kellogg Co. Completion date February 1955.

17 miles, 6-in., Kwinana to Fremantle. M. W. Kellog Co. Completion date February 1955.

Columbian Ministry of Petroleum—115 miles, 4-in., under way, La Dorado to Cartago, Colombia, Williams Bros. Engineers.

93 miles, 8-in., under way, Cantimplora to Dorado, Colombia, William Bros. Constructors.

• **Empresa Nacional del Petroleo** — 80 miles, 6¾-in., planned, Concon to Santiago, Chile.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

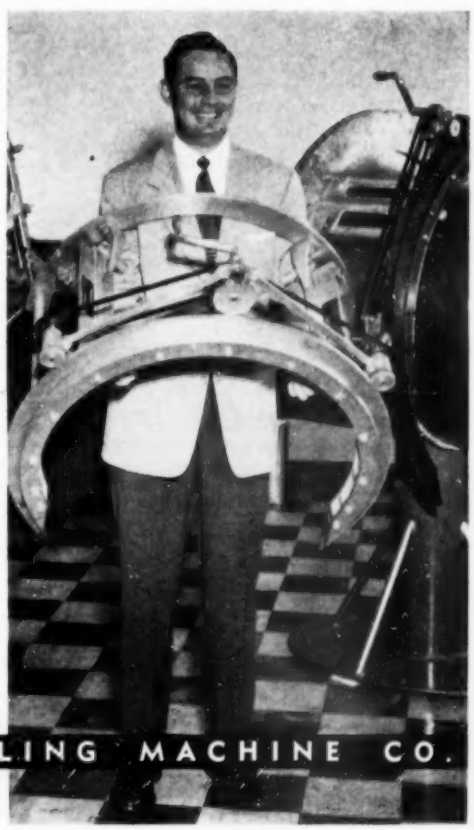
"Miss Lovelace, make a note to sue Cornish, the oil man!"

H & M PIPE CUTTING AND BEVELING MACHINES NOW 40% LIGHTER!

HERE IS THE AMAZING STORY . . .

A completely new manufacturing process has made it possible to drastically reduce the weight of the renowned H & M Pipe Cutting and Beveling Machine. The search for a light, tough metal was started many months ago in an attempt to make the H & M line the lightest in its class without destroying any of its famous accuracy, long life, or economy. After months of searching, a satisfactory process was finally encountered. The H & M test model was rigged to an electric motor and the torch arm automatically sent around the pipe over 25,000 times. During the test, sand and other abrasive materials were blown into the highly machined gears, and the machine exposed to a multitude of simulated weather conditions. A micrometer check following this torturous test showed NO WEAR ON THE GEARS.

Here are the amazing new weights of the H & M Pipe Cutting and Beveling Machine: #3 machine — 14" to 20" pipe formerly 89½ lbs now 53 lbs.; #4 machine — 22" to 26" pipe formerly 123 lbs. now 66 lbs.; #5 machine — 28" to 36" pipe formerly 155 lbs. now 95 lbs. (all weights are approximate).



THE H & M . . . Lightest in its Class!

H&M PIPE BEVELING MACHINE CO.

U. S. Trademark Reg.

311 EAST THIRD, TULSA, OKLA.
PHONE 3-0241

HENRY H. PARIS DISTRIBUTOR Inc.
Manufacturer's Agent - Oil Well and Refinery Supplies
P. O. BOX 932 HOUSTON, 1125 ROTHWELL ST. TEXAS

Agent and Distributor for the following Nationally Known Manufacturers:

ALTEN FOUNDRY & MACHINE WORKS
Lancaster, Ohio
Pumping Units, Jacks & Surface Equipment

MUD PRODUCTS, INC.
Tulsa, Oklahoma
Mud "O" Ring Butterfly Valves

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio
OIC Valves, Bronze, Iron, Cast and Forged Steel for all purposes

THE GORMAN-RUPP COMPANY
Mansfield, Ohio
Centrifugal Pumps

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

HARRISBURG STEEL CORPORATION
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings

STEEL FORGINGS, Inc.
Shreveport, La.
Weld Saddles

LOS ANGELES BOILER WORKS
Los Angeles, California
Welding Caps—Dished & Flanged Heads

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

MILLS IRON WORKS, INC.
Los Angeles, Calif.
Seamless Swage Nipples, Bull Plugs & Welding Reducers

WESTERN SAFETY BARREL STAND
Houston, Texas
Stand lifts, holds, tilts 55 gal. barrels
Prevents spillage—easily loaded

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for
OIL COUNTRY TUBULAR PRODUCTS.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States and Canadian Governments**—600 miles, 8-in., planned, Haines to Fairbanks, Alaska.

Foreign Natural-Gas Pipe Lines

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo** — 80 miles, 10-in., planned, Concon to Santiago, Chile.

• **Mid-Continent Pipelines, Ltd.** — 1,860 miles, 30-in., proposed, Alberta to Montreal, Canada. Fish Engineering Co.

• **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos. — 205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

• **Trans-Canada Pipe Lines, Ltd. (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

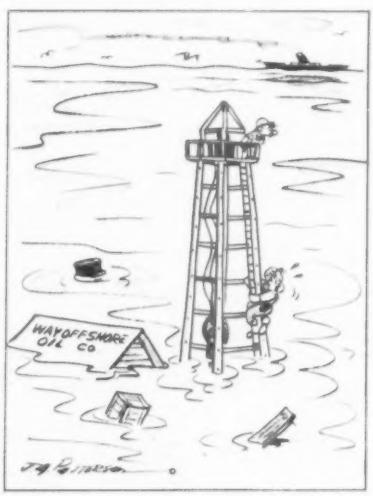
• **Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis engineers.

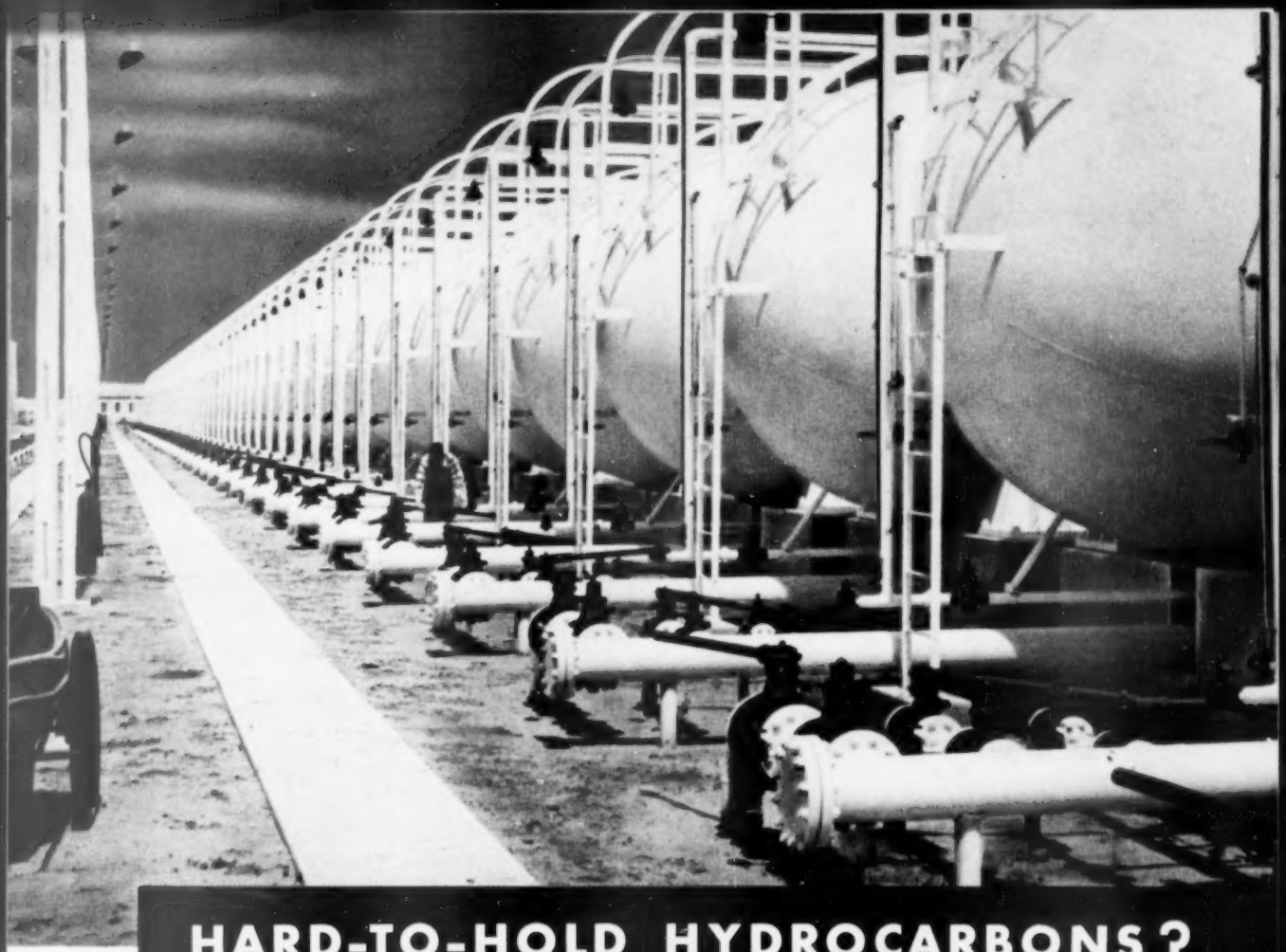
138 miles, 20-in., planned, Sumas to Tacoma, Wash.

139 miles, 18-in., planned, Tacoma, Wash., to Portland, Ore.

• **Western Pipe Lines.**—833 miles, 24-in., proposed, from southern Alberta, eastward across the Canadian prairies, serving principal towns and cities along the route.

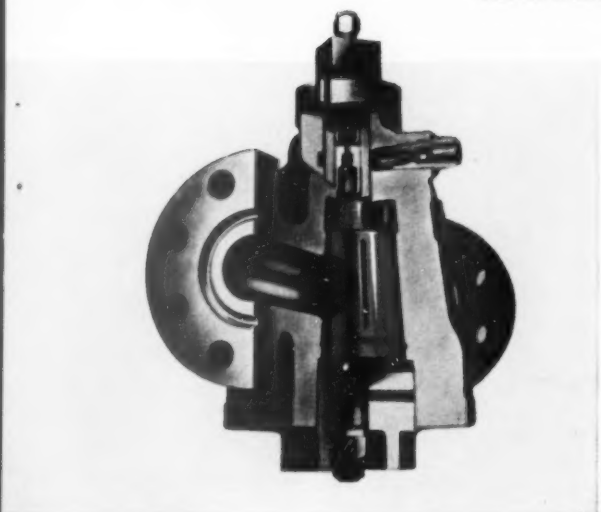


"Are you sure this is nothing but high tide??"



HARD-TO-HOLD HYDROCARBONS? Nordstrom *LUBRICANT SEALS* Them

In this case, it's one of the world's largest butane and propane tank batteries that Nordstrom valves are controlling. But it might be any one of hundreds of volatile hard-to-hold hydrocarbons.

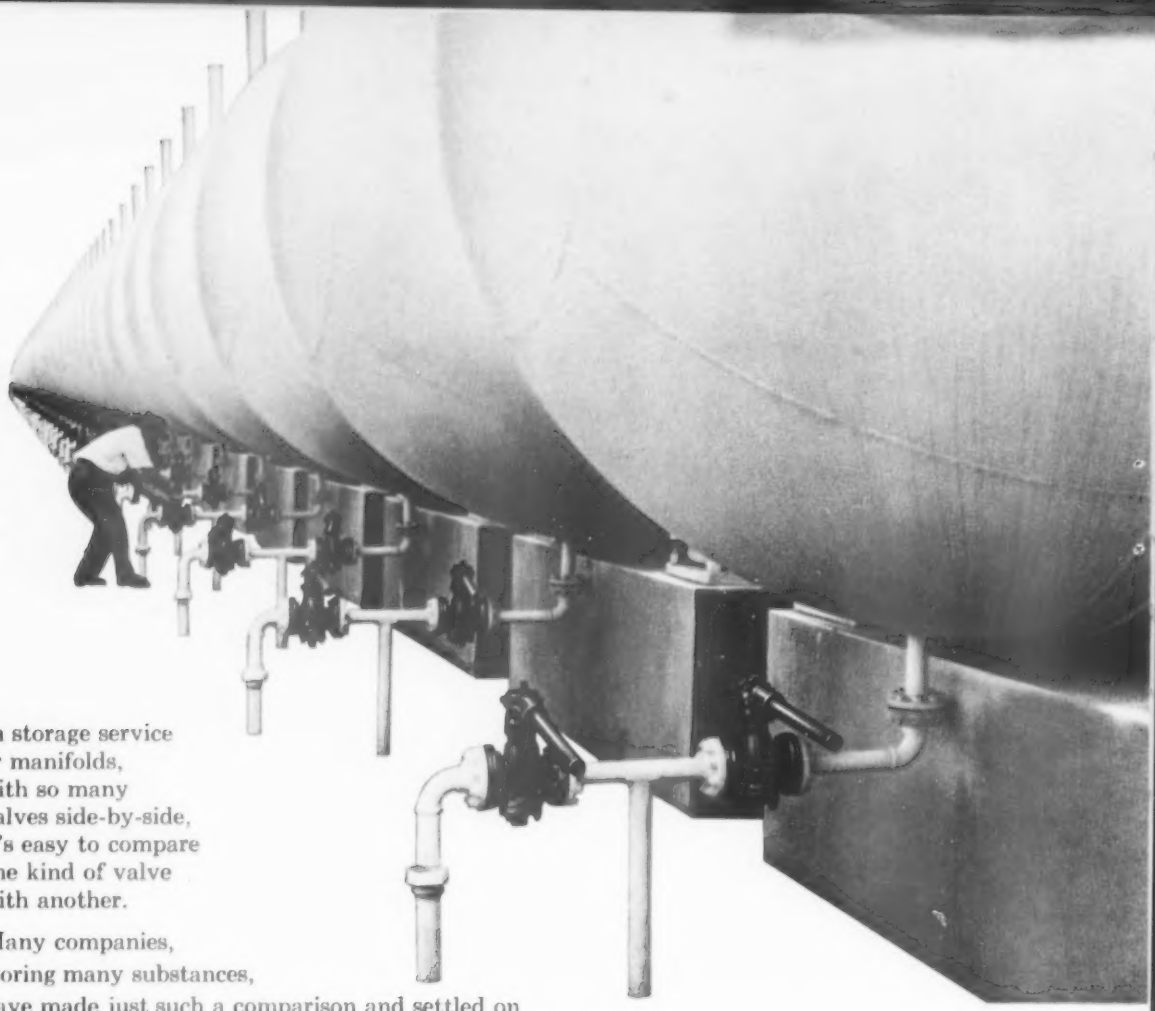


Nordstrom valves don't depend on metal-to-metal contact to check these light, tricky gases and fluids. Nordstrom valves have a seal of plastic lubricant around all seating surfaces—double protection against leaks of inflammable liquids or vapors.

Be sure—really sure. Use Nordstrom valves and genuine Rockwell lubricants. That's the *right* way—that's the *tight* way.
Rockwell Manufacturing Company, Pittsburgh 8, Pa.

ROCKWELL Built
Nordstrom Valves
Lubricant-Sealed for Positive Shut-Off

Another ROCKWELL Product



In storage service
or manifolds,
with so many
valves side-by-side,
it's easy to compare
one kind of valve
with another.

Many companies,
storing many substances,
have made just such a comparison and settled on

NORDSTROM VALVES

Since Nordstrom valves are doubly sealed with an internal film of plastic lubricant, they are doubly protected against the little leaks that can become big dangers. Nordstrom valves operate quickly, too, for it takes only a quarter turn of the plug to change from fully open to fully closed.

AND ROCKWELL LUBRICANT

. . . the same lubricant that adds to valve tightness, acts as a jack to keep the plug ready to turn. Just as they cut costs in nearly every service to which they've been applied, Nordstrom valves and genuine Rockwell lubricants

CUT STORAGE COSTS

Remember, the lowest cost valve is not necessarily the cheapest—
it is the valve which does its job best for the longest time.
Rockwell Manufacturing Company, Pittsburgh 8, Pa.

Nordstrom Valves Another Quality **ROCKWELL** Product

DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 FAESSLER TUBE EXPANDERS. A new brochure covering construction and operation of its complete line of refinery type tube expanders includes illustrations of six basic types of Faessler tube expanders, with a short description of their construction and application; complete charts on expander numbers, sizes, weights, and dimensions; instructions on ordering the correct expander for a particular application; and a supplemental price list. *J. Faessler Manufacturing Co.*

2 FINDING A WORLD OF OIL. Facts about GSI and its relation to you, the publication gives a simplified explanation of seismic work and tells how the presence of a seismograph field party is beneficial to local economy. *Geophysical Service, Inc.*

3 NELSON PICTORIAL INDEX is of importance to any person specifying or buying electrical control equipment, power transmission equipment, and electrical switchgear. The pictorial index is a 16-page brochure showing over 60 of the principal items of electrical equipment that are manufactured by the firm. Complete captions are provided for each piece of equipment summarizing its function. *Nelson Electric Manufacturing Co.*

4 KENNAMETAL CARBIDES FOR THE OIL MAN is the title of a new brochure in which current and potential uses of Kennametal sintered carbides to combat wear and shock resistance in the oil industry are discussed. General information is given on Kennametal's shock and wear qualities in other industries where it has been in service for drilling rock both by rotary and percussive methods, its use for flow beans by many manufacturers, its 14 years of use as standard equipment for valving in the Kobe Free pump, and for scores of severe steel-cutting applications. *Kennametal, Inc.*

5 HYDROSTATIC PIPE-LINE TESTING, a four-page, two-color brochure depicts the equipment, method of operation, personnel, applications, and service of this pipe-line service firm. *Williams Pressure Service Co.*

6 THE FINEST FOR OIL FIELD USE, STITT SPARK PLUGS. Perforated for insertion in most loose-leaf binders, Catalog No. 41 covers the firm's line of Triple Ignitor spark plugs and regular type plugs for both stationery and mounted oil-field engines, and automotive plugs. Many of these plugs in both Triple Ignitor and the regular line are specifically designed for sour gas fuel. The booklet also presents a heat range chart, specification tables, a fuel conversion chart, and a list of spark plugs engineered for specific oil-field engines. *Stitt Ignition Co.*

7 PORTABLE VALVE-SEAT GRINDER describes equipment with which any mechanic can do a precision valve-seat-grinding job in the field. The complete unit weighs 22 lb. and may be used wherever air pressure is available. Three models cover a range of valve seats having inside diameters from 2-15/16 to 12 in. *Thompson Products, Inc.*

8 TANK CAR CLASSIFICATIONS FOR LADINGS was published primarily as a service to shippers of bulk commodities. Included are the latest types of tank cars approved for a variety of specific commodities. The listing was prepared in accordance with all current regulations. In addi-

FOR MORE INFORMATION . . . . use one of these.

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD
Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Nov. 30, 1953

PLEASE PRINT
COMPANY NAME .....
STREET ADDRESS .....
CITY ..... ZONE NO. ..... STATE .....
NAME ..... TITLE .....

tion to the listings are engineers' drawings of dome arrangements for each type and a nomenclature drawing. *American Car & Foundry Co.*

9 UNIMIX SIDE ENTERING TANK MIXER. A cut-away drawing with all outstanding features noted, covers the center spread of this four-page multicolor booklet. An installation picture and data table give essential details on this tank-farm mixer. *United Centrifugal Pumps.*

10 YALE LOAD KING HAND HOISTS with capacities from ½ to 2 tons, are described and illustrated in Bulletin P-1254A. Among the hoist's advantages, as depicted in the eight-page booklet, are unusually light weight (the ½-ton model weighs only 36 lb.) and up to 95 per cent efficiency for faster and easier lifting. Design features illustrated include Yale's Synchro-matic load brake, which provides instantaneous brake and release, and the steel safety load hook, which, when overloaded, opens slowly without fracture, thereby protecting mechanism, load, and workmen. *The Yale & Towne Manufacturing Co.*

11 CAT-BUILT PIPE LAYERS AT WORK. This eight-page booklet contains nine photographs illustrating the Cat Pipe Layer working in many applications. Mounted on Caterpillar track-type tractors, this rig is shown being used as a mobile crane handling the lifting and lugging of heavy objects in a variety of industries. Simplification and economy in such a rig and its ability to operate in rough terrain are explained. *Caterpillar Tractor Co.*

12 FLOW SIGNAL TRANSMITTER. Bulletin 2653 illustrates and describes a combination 1,500-psi. liquid line-flow measuring element and pneumatic flow-signal transmitter equipped with square-root extraction cam for linear indication, recording, or control of furnace fuel and process liquids. Design features discussed include the integrally constructed measuring orifice with differential-pressure bellows that requires no sealing fluids; simplicity of checking the instrument by dead-weight calibration; accuracy of better than 1 per cent of full-scale reading, and sizes of measuring elements up to 2,000 gal. per hour. *Hagan Corp.*

13 FILTERLESS HI-EF LINE TYPE PURIFIERS. A new separator catalog fully describes Anderson's line type Hi-eF purifiers and their many uses throughout the industry. The folder discusses removal of entrained moisture and scale in steam to turbines, reciprocating engines, and regulating valves; oil, dirt, and condensate, from exhaust steam; condensate from compressed air lines; dirt particles and line scale from steam in food-processing operations; and entrainment and carry-over from vapor lines following evaporation. *The V. D. Anderson Co.*

14 THE CASE OF THE AILING WELDOLLAR presents an analysis of the basic causes of high costs and suggests a plan for reducing these costs. According to analysis, labor and overhead are responsible for 87.85 per cent of the cost of welding. The cure for this high cost is high usable welding currents, faster welding speeds, and less machine down time. How these can be achieved is presented briefly and with clear graphic explanation in the pages of the booklet. *The Lincoln Electric Co.*

15 TYPE D FIRST AID KITS. First aid supplies of pharmaceutically controlled quality, in a redesigned case, are reported in Bulletin 0401-2. Under a rigid system of quality control, the manufacture and testing of every first-aid item in the kit is traceable back to its origin, with control numbers on each package. The individual Unit D packages feature new, simplified, fully illustrated instructions. A new blue color gives both the Unit D boxes and the kits a clean distinctive appearance. *Mine Safety Appliances Co.*

16 CUSHIONED SOLENOID OPERATED VALVES. A new eight-page technical bulletin fully describes the Golden-Anderson solenoid operated valve. Solenoid operated valves automatically open or close in response to time clock, pressure switch, manual switch, or other impulse. This new bulletin contains complete operating instructions along with detailed parts lists and dimensions. *Golden-Anderson Valve Specialty Co.*

FOR MORE INFORMATION . . . . use one of these cards

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20)
(21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40)
(41) (42) (43) (44) (45) (46) (47) (48) (49) (50)

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Nov. 30, 1953

PLEASE PRINT
COMPANY NAME .....
STREET ADDRESS .....
CITY ..... **ZONE NO.** ..... **STATE** .....
NAME ..... **TITLE** .....

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD
Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

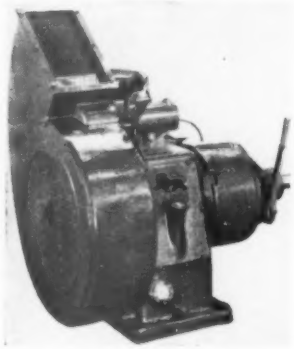
THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

DIGEST OF NEW EQUIPMENT

IT'S NEW ✓ CHECK IT

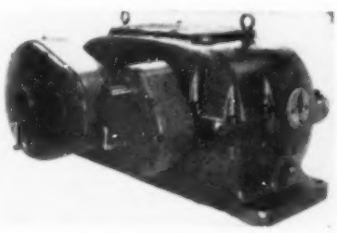
by Dan B. Miller

17 NEW SINGLE-CYLINDER, VALVE-IN-HEAD PUMPING ENGINE. The new engine, called the A114, is a 114-cu.-in.-displacement, single-cylinder, valve-in-head, pumping engine designed especially for oil-field use with an extra-heavy flywheel. The A114 will develop 14.8 maximum horsepower and 9.7 A.P.I. horsepower at 1,200 r.p.m. Replaceable wet sleeves for quick service, a specially designed governor which responds quickly to unbalanced load conditions, a short heavy counterbalanced crankshaft, and a heavily constructed crankcase are design features which make the A114 long-lasting, easily maintained engines. The power takeoff shaft is the only unguarded moving part. A closed vaporing-condensing cooling system with large coolant capacity maintains proper engine temperatures for economical operation with little attention at all times. Large oil capacity and oversize oil filters make excellent lubrication possible with maximum maintenance. *Le Roi Co.*



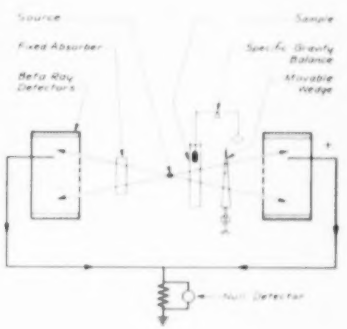
IT'S NEW ✓ CHECK IT

18 SIZE 6 P.I.V. POSITIVE INFINITELY VARIABLE DRIVE provides stepless speed control with positive features of chain drive for 20 to 25-hp. requirements. The drive consists of a self-tooth-forming chain operating between two pairs of conical-toothed wheels. The chain contains packs of hardened steel laminations free to move from side to side, which mesh with the grooves in the wheels. Axial movement of these conical wheels permits chain to operate on small or large diameter as desired, for an infinite number of speed change ratios. This model is available in three types: the basic drive, with input or output single reduction helical gears, or with both input and output single reduction helical gears. The wide range of gear ratios can be used as step-up as well as reduction gears. The firm also offers P.I.V. drives in seven other sizes, ranging from ½ to 15 hp. *Link Belt Co.*



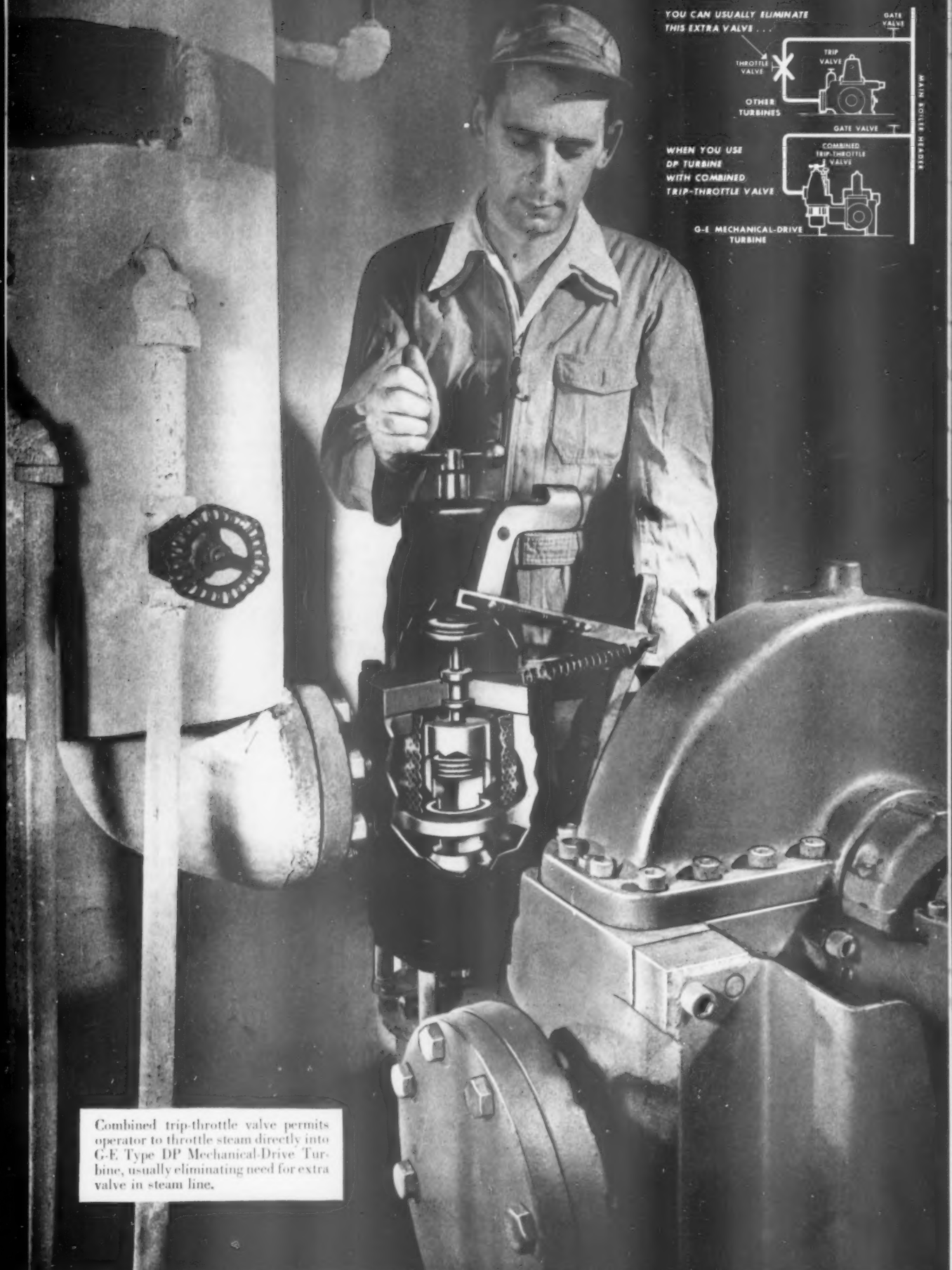
IT'S NEW ✓ CHECK IT

19 BETA RAY H/C METER. The use of an atomic byproduct in a new instrument will reduce the time cycle required for a basic product control test in the petroleum industry from 4 hours to 5 minutes and, at the same time, increase accuracy more than 100 per cent. The new instrument measures the percentage hydrogen and H/C ratio in liquid hydrocarbons by a process that utilizes the absorption of beta rays. The instrument was demonstrated for the first time to a group of leading petroleum research and production leaders at the annual meeting of the American Petroleum Institute. Performance of pilot model beta rays indicates that individual determinations can be made with a statistical probable error of 0.02 weight per cent hydrogen. Corrections, usually of small magnitude, can be made to take into consideration the presence of oxygen, nitrogen, sulfur, lead, and other elements. The combustion technique tests usually resulted in a statistical probable error up to 0.05 weight per cent hydrogen. The beta-ray instrument is adapted for control in actual production operations in the petroleum refining industry. Preliminary use of the equipment indicates it can be used advantageously at various stages in the production line for gasoline, diesel fuel, and other pe-



KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.



Combined trip-throttle valve permits operator to throttle steam directly into G-E Type DP Mechanical-Drive Turbine, usually eliminating need for extra valve in steam line.

ANOTHER PLUS VALUE OF G-E MECHANICAL-DRIVE TURBINES...

Combined Trip-throttle Valve Cuts Turbine Installation Costs

To save you the cost both of buying and installing a throttle valve in the steam line, General Electric designed into its standard Type DP mechanical-drive turbine a trip valve which also functions as a throttle valve. This feature alone can save you up to $200.00 at time of installation.

The combined trip-throttle valve controls steam admission to the turbine on starting and also shuts off all steam in case of overspeed. No need in most cases to shut off steam valves ahead of the turbine before restarting the unit. The combined trip-throttle valve can quickly be reset and the turbine put back on the line, saving you time in an emergency.

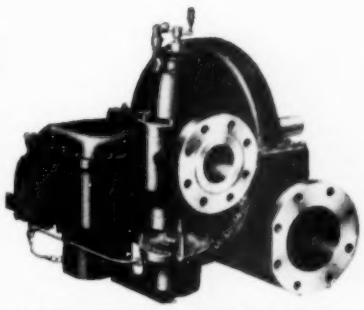
THIS COMBINED TRIP-THROTTLE VALVE is just one of many DP features which save you money. The chart below indicates other areas of savings.

Remember—the total cost is often more than just the sales price. But G.E.'s standard DP turbines include the extra features to save you extra costs. For more information contact your nearest G-E apparatus sales office. Write for bulletin GEA-4955A, "A New Standard in Mechanical-drive Turbines," General Electric Company, Schenectady 5, N. Y. 252-63

GENERAL ELECTRIC

INSTALLATION AND MAINTENANCE COST-SAVING FEATURES

THESE EXTRA FEATURES, STANDARD ON ALL G-E TYPE DP TURBINES, CAN . . .	Save You up to
COMBINED TRIP-THROTTLE VALVE Eliminate extra cost of buying and installing valve ahead of the turbine.	$200.00
SINGLE RESERVOIR FOR COOLING LUBE OIL Eliminate extra cost of piping cooling water to and between bearings.	50.00
MAJORITY OF PARTS INTERCHANGEABLE One set of spare parts protects several units—less money tied up in inventory.	100.00
METALLIC-LABYRINTH VALVE STEM BUSHING Eliminate labor costs of replacing soft packings; cut down-time production losses.	50.00
SHAFT MONEL-SPRAYED AT PACKING FIT Saves frequent cost of purchasing and installing carbon rings; contributes to long shaft and packing life.	20.00
ESTIMATED TOTAL SAVINGS	$420.00



G-E Type DP Mechanical-Drive Turbine

COMPARE THE FEATURES
EVALUATE ALL THE COSTS

See why G-E standard Type DP turbines are your most economical buy.

troleum products as a means of obtaining a higher degree of quality control and uniformity in the finished product. *Central Scientific Co.*

IT'S NEW CHECK IT

20 TWO NEW FOUR-WHEEL-DRIVE MODELS are specially designed for use in rough terrain. The two models are the International R-140-4 by 4, with gross vehicle weight rating of 11,000 lb., in 130 or 142-in. wheelbase; and the R-160-4 by 4, with gross vehicle weight rating of 15,000 lb., in 154 and 172-in. wheelbase. Front and rear axles of both new models are single reduction hypoid bevel gear type. Transfer case in both has 1 to 1 to 1.87 gear ratios providing, in combination with the four-speed transmissions, eight forward and two reverse speeds. The transfer case is designed for the mounting of a full-torque power takeoff at rear of input shaft. Model R-140-4 by 4 is powered by the 100-hp. Silver Diamond 220 engine, with a maximum torque of 173.5 at 2,000 r.p.m. Standard transmission is a sliding-gear selective type with four speeds forward and one reverse. Power-takeoff openings are located on the right and left sides to handle front-mounting winch. Optional transmission is the four speed syncromesh, with one power-takeoff opening. Model R-160-4 by 4 is powered by the 108-hp. Silver Diamond 240 engine. The SD 240 delivers 108 hp., with maximum torque of 192 at 1,400 r.p.m. Standard transmission is a sliding-gear selective type with four speeds forward and one reverse with power-takeoff openings on right and left sides. Optional transmission is a four-speed syncromesh type with one power takeoff. Both models are available with front-mounted winch. *International Harvester Co.*

IT'S NEW CHECK IT

21 A NEW GASOLINE-SOLUBLE DYE. The new dye will produce a red-orange or bronze shade, and its use will simplify operations for refiners who have previously obtained this shade by the addition of several dyes. Oil Bronze is uniform in shade strength and physical condition. It has a high solubility and a rapid rate of solution in gasoline. It is not extracted with distilled water, sea water, or O.1N caustic solution. Oil Bronze can be easily handled by any standard method of dye addition including dry dye eductor systems. *E. I. du Pont de Nemours & Co.*

IT'S NEW CHECK IT

22 TYPES S AND SLS CONTROL HEAD PACKERS include the following outstanding features: positive releasing slips expand on a flat tapered surface which increases the area of contact, preventing the collapse of the slip mandrel or breakage in the slips; positive lateral packer cup expansion makes a perfect seal with no sticking of cup; full opening maintained through the entire body of the packer; controlled packer cup expansion; easy setting; and a large bypass area which assures fast running and pulling through the heaviest mud. *American Iron & Machine Works Co.*

IT'S NEW CHECK IT

23 NEW CONTROL VALVE LINE. A new line of high-capacity automatic control valves was primarily designed for the safety and relief valve field but it can easily be adapted for almost all liquid and vapor control services by changing only the external actuating equipment. The basic valve utilizes a body design and operating principle which allows outstandingly high flow capacities under actual flow tests. The valve has angle body design and is available in 2, 3, 4, and 6-in. sizes for pressures ranging from 3 oz. per square inch to 150 psi. It is extremely simple and durable. The valve has only one moving part and uses no large springs, moving pistons, stuffing boxes, or close-tolerance guides. The valve can be opened and closed manually and automatically either at the valve or at a remote location. The valve can be pneumatically, hydraulically, or electrically operated from a remote location. It is easily adjusted and tested. The external actuating equipment can be removed for calibration and repair or can be replaced without removing the basic valve. A high-capacity pressure relief valve was specifically developed for the low-pressure field, 3 oz. per square inch to 15 psi. This valve has wide application in the chemical storage field and petroleum products. *Controlled Flow Valve Co.*

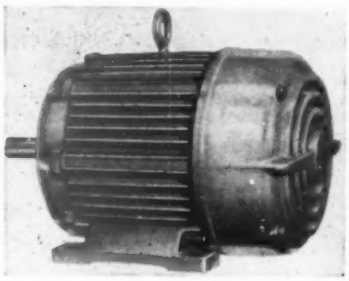
IT'S NEW CHECK IT

24 NEW TRAHAN COLLAPSIBLE KELLY is designed for more economical workover jobs. The Trahan is capable of performing all the duties of the regulation kelly. Its compactness in collapsed position permits it to be easily transported without any special handling. Operator is able to have complete well control using the Trahan with a stripper-type preventer, and packoff is effective around tubing at all times. This permits control of fluid so that it can be directed into mud tanks on top of ground or other locations. In operation tool clamps directly on tubing and fits into any size rotary table. Tool in extended position is approximately 75 in. over-all, and when pipe is lowered approximately 60 in. in the hole, tool is released from tubing and extended to open position by use of catline and new grip is taken on the tubing. To add a joint of tubing, bowl

and slips may be set on head, and joint added. Jaws are made from replaceable tong buttons and are so arranged that tubing cannot be crushed or damaged. *Henderson Welding Works.*

IT'S NEW CHECK IT

25 NEW L.A. LINE OF ELECTRIC MOTORS made in open dripproof, totally enclosed fan-cooled and explosionproof enclosures in ratings up to 40 hp. at 3,600 r.p.m. These new motors are built in accordance with the new N.E.M.A. frame-size standards. This new L.A. line features improved ventilation, greater protection, a new conduit box arrangement, new bearing construction, and more versatile mounting.



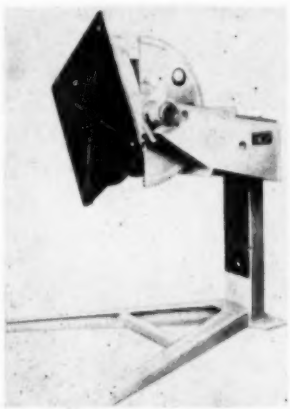
The new motor line has about the same volume of active material as previous motors, and, therefore, the usual motor service factors and liberality of design. Utilizing more power in a smaller unit has been accomplished by the use of larger lamination diameters, and longer stacking with shorter coil ends. Ventilation is more efficient and effective due to better utilization of aerodynamic principles. The new L.A. line is also lighter and more compact for each horsepower and speed because much of the unnecessary, inactive material has been eliminated. Size and bulk of the cast-iron housing and motor bearing brackets have been reduced without sacrificing mechanical strength. Bearing construction has been improved. Bearings and shafts have been selected for long life and better overload capacities for V-belt drives. *The Louis Allis Co.*

IT'S NEW CHECK IT

26 PIPE-LINE OIL SAMPLER. Operating entirely from the line flow, the sampler with sizes to fit all standard pipe lines, has a calibrated head which enables the operator to select the exact amount of sample desired. The amount selected will remain constant regardless of the rate of flow. If the fluid stops, the sampler stops. Easily installed, the sampler does not restrict the flow of the fluid and can be removed and plate put on line adapter without again breaking into the line. Minimum of moving parts operating in the oil flow assures long life. *McFarland Engineering & Pump Co.*

IT'S NEW CHECK IT

27 NEW WELDING POSITIONERS. The new units are being built in 2,500, 3,000, and 6,000-lb. capacities and incorporate a special variable-speed drive. Of differential type with all components mounted on ball bearings, this drive provides stepless speed change from 0 to predetermined top speed. An accurately calibrated hand wheel or electric remote speed control is provided. The table on these positioners is driven by a spur gear and pinion for minimum backlash and most accurate adjustments. The reducer is bolted to the yoke so that adjustments can be easily made. A builtin high-capacity ground gives resistance free return of the welding current which results in more uniform welds. Table tilting speed is 135° in 40 seconds and table height is adjustable in 6-in. steps for handling various sizes of work most effectively. A tilt indicator is standard equipment for accurate location of pieces at the best working angles. The positioners are mounted on heavy-duty, fabricated steel posts machined on the front side for easier raising and lowering of the unit. *Worthington Corp.*



IT'S NEW CHECK IT

28 HIGH-PRESSURE LIQUID AND GAS FILTERS, manufactured in series 1H and 1HG, respectively, are available for operating pressures up to 1,000 psi. Filters designed for even higher pressures are available upon request. Construction is all welded steel with head piece machined from bar stock. Pipe sizes for inlet and outlet connections are ⅜, ½, and ¾-in. Guaranteed degrees of filtration through the Micro-Klean cartridges are 10, 25, 50, and 75 microns (0.000934 in. to 0.0029 in.). Maximum capacity for liquid at 150 SSu, 2 psi. pressure drop and 50-micron degree of filtration is 15 g.p.m. For gases at 1,000 psig., 2 psi. pressure drop and 25-micron degree of filtration maximum capacity is 200 S c.f.m. (free air). *Cuno Engineering Corp.*

IT'S NEW CHECK IT

29 TYPE SB-10 CRANE WEIGHT AND RADIUS CAPACITY INDICATOR. A simple dual hydraulic system employing a direct load pressure transformer makes it possible to incorporate all three lifting, measuring factors into one gage. The indicator shows the operator the boom radius at which he is operating; the safe capacity of his crane at that radius, and the weight he is lifting in pounds. *Martin-Decker Corp.*

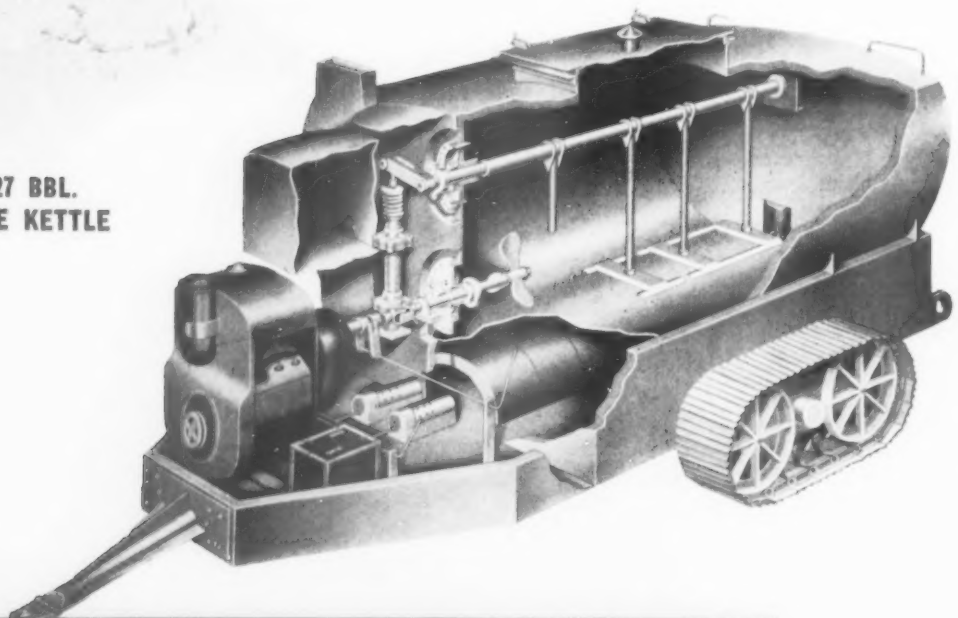
WHAT ARE THE IMPORTANT FACTORS IN dope kettles?

- Constant temperature from top to bottom
- Longer bottom life
- As much as 30% saving in fuel consumption
- Plug type draw-off valve
- No coking
- Low maintenance

All these important features are incorporated in the CRC "SP" Kettle. The combination of propeller and sweep agitation assures uniform temperature from top to bottom of kettle. Special insulation design helps to reduce fuel consumption. These special features coupled with a positive plug type shut-off valve and elimination of coking all mean that you will get maximum efficiency and have minimum maintenance cost when you use the CRC "SP" Dope Kettle.

Write for folder which gives complete details.

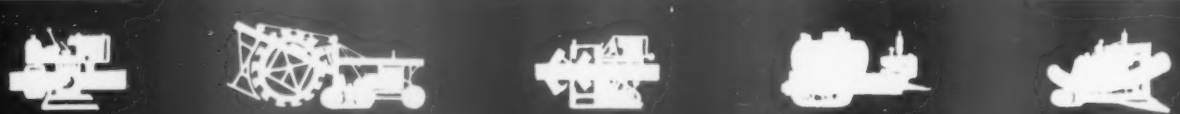
CRC 27 BBL.
SP DOPE KETTLE



CRC

CRUTCHER • ROLFS • CUMMINGS, INC.

C-R-C has been First with every major development in pipeline equipment



PIPE LINE

Shell to Open Division Headquarters in Denver

DENVER.—Shell Pipe Line Corp. will open a division headquarters office here in December which will supervise operation of the company's gathering system in the Denver-Julesburg basin and future pipe-line developments in the Rocky Mountain and Williston basin areas.

Division personnel will be located in Shell's new building in Denver, now under construction. The gaging staff will be in Sterling, Colo. The Denver division will operate under the Mid-Continent area office at Cushing, Okla.

Texas Eastern Gets FPC Approval for Gas Lines

WASHINGTON.—The Federal Power Commission has authorized Texas Eastern Transmission Corp., Shreveport, to construct about 17 miles of natural-gas lines and a new 4,400-hp. compressor station in Texas.

A proposed 5.3-mile, 6-in. line will transport approximately 1,000,000 cu. ft. of gas daily from Englehart field in Colorado County, Texas, to the company's Provident City, Tex.-Castor, La., transmission system, along which the new compressor station will be built in Shelby County, Texas. The remaining authorized line, which will be 8 in., will extend from North Big Hill field in Jefferson County, Texas, to Texas Eastern's existing Provident City-Beaumont line.

The project, which will help bolster gas supplies in the Provident City area, will cost an estimated $1,981,900.

Ohio Fuel Plans to Lay 63 Miles of Gas Lines

WASHINGTON. — Ohio Fuel Gas Co., Columbus, is seeking Federal Power Commission authority to construct about 63 miles of gas lines in Ohio.

The proposed project includes 14.4 miles of 20-in. loops along an existing line between the company's Crawford and Mount Sterling compressor stations providing additional service to the Dayton-Cincinnati area; 6.6 miles of 16-in. line paralleling existing facilities near Kenton; 11 miles of 20-in. and 10.5 miles of 16-in. line near New Baltimore; 13.3 miles of 16-in. replacing a present line from North Baltimore to Bowling Green, and 7.5 miles of 16-in. pipe replacing portions of an existing line between Berlin Heights and Norwalk.

In all the company will retire 34.6 miles of existing 8⅝, 10¾, and 12¾-

Products Pump Station Pumps Water

This Kaneb Pipe Line Co. pump station at Wichita, Kans., is not being used for its original purpose. Instead of starting refined products on their northward journey through Central Kansas to Fairmont, Neb., it is helping to transport 1.5 million gallons of water daily from Wichita to drought-stricken El Dorado, Kans.

CLEANER PIPELINES CO.
1900 Armour Road
North Kansas City, Missouri

INTERNAL PIPELINE CLEANERS
EXPANSIBLE RUBBER CORE
For Gas Transmission Lines
6" Through 30"

SPRING LOADED CLEANERS
Individual Coil Springs
Under Each Brush
For Oil, Gas and Products Lines
10" Through 30"

NIGHT CAPS — SQUEEGEES

Pipeline Tools
and other accessories

WRITE FOR CATALOG

For easy handling of coated pipe!
CROSE ENDLESS PIPE BELT SLINGS

The finest belt sling available for handling coated pipe on lowering-in operations. For pipe sizes from 8" to 36". Conventional type belt slings available for 4" to 36" pipe.

Crose
MANUFACTURING COMPANY, INC.
2715 DAWSON ROAD • TULSA, OKLAHOMA
BRANCH OFFICES: HOUSTON • NEW YORK • NEWARK
EDMONTON • DENVER

S. E. HUEY & CO.
ENGINEERS & SURVEYORS
HENINGER BLDG.
MONROE, LA.

SURVEYING & MAPPING

PIPE LINE SURVEYS

Write or Wire
for Monthly Stock Lists

● VALVES
● PRESSURE TUBING
● STEEL

Peerless Supply Co., Inc.
L D 75 & 76 P. O. Drawer 36 A
Shreveport, La.

in. line. The applicant maintains the $2,688,000 project is needed to provide adequate service during the 1954-55 winter.

Texas Pipe Line Salvaging 139 Miles of Crude Lines

HOUSTON.—Texas Pipe Line Co. has let a contract to Panama-Williams Co., Houston, to take up and salvage about 139 miles of crude-oil pipe lines.

Of the total mileage, approximately 128 miles consists of parallel 8⅝-in. lines between the company's Concord station in Leon County and its Dobbin station in Montgomery County, Texas. Eleven miles of 10¾-in. loop line also will be recovered and reconditioned.

Stock Being Sold in New 472-Mile Products Line

NEW YORK.—About $3.5 million in stock is being offered by Eastman, Dillion & Co. here in Oklahoma Mississippi River Products Line, Inc., which is building a 472-mile, 10 and 12-in. products line from Duncan, Okla., to West Memphis, Ark.

Being offered is $3 million in 25-year, 5½ per cent subordinate debentures and 480,000 shares of common stock. The sale is in units of $50 principal amount of debentures and eight shares of the 1-cent par common. Each unit costs $50 plus accrued interest on the debentures. Also, Eastman is offering 300,000 capital shares at $1 per share.

Proceeds from the sale will go into the $21.3 million products system. The remaining $18 million has been borrowed from two insurance companies. Major interest in the line is held by Sunray Oil Corp., Tulsa.

Standard Begins Deliveries Through New Products Line

WHITING, Ind.—Products deliveries to River Rouge, on the outskirts of Detroit, from Standard Oil Co.'s 220,000-bbl. refinery here are being made through the company's new 244-mile, 12 and 10-in. products line.

In addition, immediate deliveries will be made to a new terminal opening near Jackson, Mich., soon. Another terminal at South Bend, Ind., has been receiving products through the new line since mid-October.

Even though the line gets its products from Standard's Whiting refinery, other Standard refineries can supply it through a connection with a network of products lines running through eight Midwestern states.

Stop Fires before they stop you

Use Ampco Safety Tools*
in hazardous locations

Employees do their best work when they know their tools are safe for the job. That's why you're money ahead when you insist on Ampco Safety Tools whenever there's a chance of fire or explosion — in spray booths, paint lockers, inflammable-liquid storage areas, or in the presence of explosive gases or dusts.

Factory Mutual Laboratories and other leading safety authorities know that the use of ordinary tools in hazardous locations often means disaster. That's why they approve and recommend Ampco Safety Tools for these spots.

Play safe! Use long-lasting Ampco Safety Tools. More than 400 different types and sizes. Order Ampco Safety Tools today for lower insurance rates, safer work, and better employee morale.

*Reg. U. S. Pat. Off.

AMPCO METAL INC.
Dept. OG-11
Milwaukee 46, Wis.

West of the Rockies it's Ampco Burbank Plant, Burbank, California.
In Canada Safety Supply Co., Toronto, Ontario

T-10A

A NEW MURPHY SAFETY SWITCH FOR SURE FULLY AUTOMATIC ENGINE PROTECTION

model O-270

Set lock-out by pushbutton. Engine oil pressure rise releases lock-out and places switch circuit in operation automatically.

Stops Engine AUTOMATICALLY when Oil Pressure Falls . . .

- Visible contacts and pressure gauge on one face
- See it work — you know it's working all the time
- Easy to install
- Simply screw into oil pressure line or on block. Run wire to magneto ground terminal.

GUARANTEED FOR ONE FULL YEAR

Sold by Engine Dealers and Supply Stores

FRANK W. MURPHY Manufacturer
BOX 1476 TULSA, OKLA
769 N. VINE ST. LOS ANGELES 38 CALIFORNIA

NATURAL GAS

Tennessee May Deliver to Pennsylvania for Equitable

HOUSTON.—Tennessee Gas Transmission Co. plans to start immediate delivery of 9,750,000 cu. ft. of gas daily for Equitable Gas Co., Pittsburgh, from the Texas Gulf Coast to the latter firm's system in western Pennsylvania.

In an application to the Federal Power Commission, Tennessee states that the deliveries would be increased to 24,375,000 cu. ft. per day by December 1, 1956. The gas will come from Equitable's contracted supplies in Flour Bluff fields, Nueces County, Texas.

Tennessee plans to receive the gas into its existing transmission system through 50 miles of proposed 10-in. lateral lines. In addition, the company proposed to add 23,000 hp. in compressor units at present compressor stations.

Addition of these facilities to Tennessee's pipe-line system will add 24,400,000 cu. ft. of gas daily to its design delivery capacity. Their construction, with that of other facilities authorized but as yet unconstructed, plus others proposed in pending applications, will increase the system's capacity to about 1,718,000,000 cu. ft. daily, and 2,100,000,000 cu. ft. on peak days *(The Oil and Gas Journal, November 16, page 187).*

Kansas Court Dismisses Suits Against Measurement Order

TOPEKA. — Suits to prevent the Kansas Corporation Commission from enforcing an order changing the measurement of gas at the well-head have been dismissed by a District Court here.

The dismissal was on the grounds that the plaintiffs, Northern Natural Gas Co., Cities Service Gas Co., and Kansas-Nebraska Natural Gas Co., did not comply with Kansas laws in bringing the suits. The companies were attempting to prevent enforcement of the order through an injunction. The court pointed out that a commission order cannot come under direct attack through an injunction but has to be handled through a judicial review of the order.

The order, which went into effect July 1, defines a cubic foot of gas as that volume of gas at a temperature of 60° F. required to fill 1 cu. ft. of space under an absolute pressure of 14.65 psi. The old method placed the pressure base at 16.4 psi.

The complainants contend that the order increases the number of cubic feet in a given volume of gas about 11.95 per cent, thus resulting in considerable less gas for the same money. *(The Oil and Gas Journal, July 13, page 171).*

FPC Opens Hearings on Cities Service's New Gas Facilities

WASHINGTON. — An application by Cities Service Gas Co., Oklahoma City, to supply the Mulvane-Derby area in Sedgwick County, Kansas, through new transmission facilities will be aired at a Federal Power Commission hearing opening here this week.

The new facilities, which were built last year, consist of 10 miles of line replacing 14 miles of line in Sedgwick County. Certain customers, to whom service has been discontinued as a result of the project, are expected to intervene in the proceedings.

More Hearings Set on Supply For Georgia, Florida Markets

WASHINGTON. — Future hearings on plans of South Georgia Natural Gas Co., Birmingham, to supply southern Georgia and northern Florida with natural gas have been scheduled for January 18 by the Federal Power Commission here.

A rehearing was opened last August on the application, which was denied by the FPC in May. The new hearing date was set to permit both the proponents and opponents of the project time to gather new evidence.

Present plans include construction of a new transmission system throughout the proposed market area.

FPC Steps Up Decision on Big Midwestern Gas Project

WASHINGTON.—Intermediate decision procedure has been eliminated to speed final determination of Northern Natural Gas Co.'s application to supply midwestern states with 300,000,000 cu. ft. of additional gas daily, according to the Federal Power Commission.

Main briefs were to be filed late last week, and reply briefs will be filed December 8. Northern Natural requested the omission of the intermediate decision procedure at the conclusion of hearings held last month on the application in an attempt to get the gas to its customers this winter.

Plans call for branch lines to be built in Iowa, Nebraska, South Dakota, and Minnesota to carry the additional supplies to 49 communities in those states. The $7,000,000 project is included in a huge 1954 construction program to bring West Texas gas to the Midwest *(The Oil and Gas Journal, November 2, page 161).*

Coking Plant Approved

SAN LUIS OBISPO, Calif.—Union Oil Co. of California has received permission from the San Luis Obispo County Board of Supervisors to construct a coking plant north of Guadalupe, Calif., if the company complies with smog-prevention regulations.

Company officials stated that very little carbon dioxide would escape from the plant. The Air Pollution Control District in Los Angeles informed the board that more than 0.4 p.p.m. of pollution particles in the air can be dangerous.

Natural Gasoline

Signal Starts Work on New South Oklahoma Gas Plant

TULSA.—Signal Oil & Gas Co. has begun engineering and design work on a proposed cycling plant in the Fox-Milroy area of Carter County, Oklahoma.

Signal will be assisted by Fox Gasoline Co. in the construction and operation of the plant. All equipment for the new installation is on order. Upon completion it will process 40,000,000 cu. ft. of gas into about 2,381 bbl. of L.P.G. and natural gasoline daily.

Plans for the multimillion-dollar plant materialized last July when operators in the area became alarmed over the continued venting of 50,000,000 cu. ft. of gas daily.

Moran Completes New Plant

TULSA.—Moran Gasoline Corp. has completed a new cycling plant in Kendrick pool of Lincoln County, Oklahoma.

The new plant will process about 8,500,000 cu. ft. of casing-head gas in the area. Its output will be approximately 357 bbl. of L.P.G., divided equally between butane and propane, and 357 bbl. of natural gasoline daily. Residue gas will be taken by Oklahoma Natural Gas Co. through a new 6-in. line connecting its main transmission system with the plant.

See Composite and Refinery Catalogs, or Write for Folder On

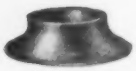
FLEET-LINE

PIPE SADDLES AND REDUCERS

Nozzle sizes from 1/4" to 24"

ASTM A234

Also for pressure vessel heads



Nominal pipe sizes 1" to 24"

ASA B16.9
ASTM A234

Eccentric

Immediate Delivery

STEEL FORGINGS, Inc.

P. O. Box 2768 • Shreveport, La.

Foot of Fannin Street

Night and day the clock around, week after week, month after month, NATIONAL AIROIL Tandem Combustion Units ceaselessly assure *"continuous operation"* for petroleum heaters in refineries throughout the Nation and the world.

YOU will realize higher profits from YOUR oil heaters when Tandem Combustion Units are specified.

NATIONAL AIROIL has a complete line of Oil and Gas Burners and Furnace Equipment for every requirement.

CHEM-PETROLEUM DIV.

NATIONAL AIROIL BURNER COMPANY, INC.

1236 Sedgley Ave., Philadelphia 34, Pa.
Southwestern Division: 2512 So. Blvd., Houston 6, Texas

REFINING

Pollution-Control Order Hits Five Kansas Refiners

LAWRENCE, Kans. — Five refineries in the Walnut River Valley of Kansas have been ordered by the state public health board here to have water-pollution abatement plans and specifications ready by January 1, 1955, along with construction schedules for completion of treatment facilities by July 1, 1957.

The order was the direct result of public hearings conducted in Arkansas City and El Dorado, Kans., last July. The owners and location of the refineries affected by the order are Anderson-Prichard Oil Corp., Arkansas City; Socony-Vacuum Oil Co., Inc., Augusta; Skelly Oil Co. and El Dorado Refining Co., El Dorado; and Vickers Petroleum Co., Potwin.

Expansion Contracts Let

CLEVELAND. — Standard Oil Co. (Ohio) has awarded Arthur G. McKee & Co. two contracts totaling $2,200,000 for construction and engineering work at Sohio's Lima, Ohio, refinery and its refinery here.

Approximately $1,400,000 will go for additional tankage and transfer facilities at the 43,000-bbl. Lima refinery. The remaining $800,000 will be used at the 50,000-bbl. Cleveland installation for a cat cracker gas compressor and plant, thermal gas plant, and revamping work on the cat poly unit.

Refining Briefs

ROUSEVILLE, Pa.—M. W. Kellogg Co. will install a new crude distillation unit at Pennzoil Co.'s 8,500-bbl. refinery here. The new unit, which will be a combination atmospheric and vacuum distillation plant, will be capable of processing up to 12,000 bbl. daily. It will replace three smaller existing distillation units.

SAN FRANCISCO. — Tide Water Associated Oil Co. has completed equipment improvements on its fluid catalytic cracking unit and alkylation unit at the company's 88,000-bbl. refinery near here. The work included additions to the gas-processing facilities in both units, and improvement of

Control Panel for New Super Pressures Unit

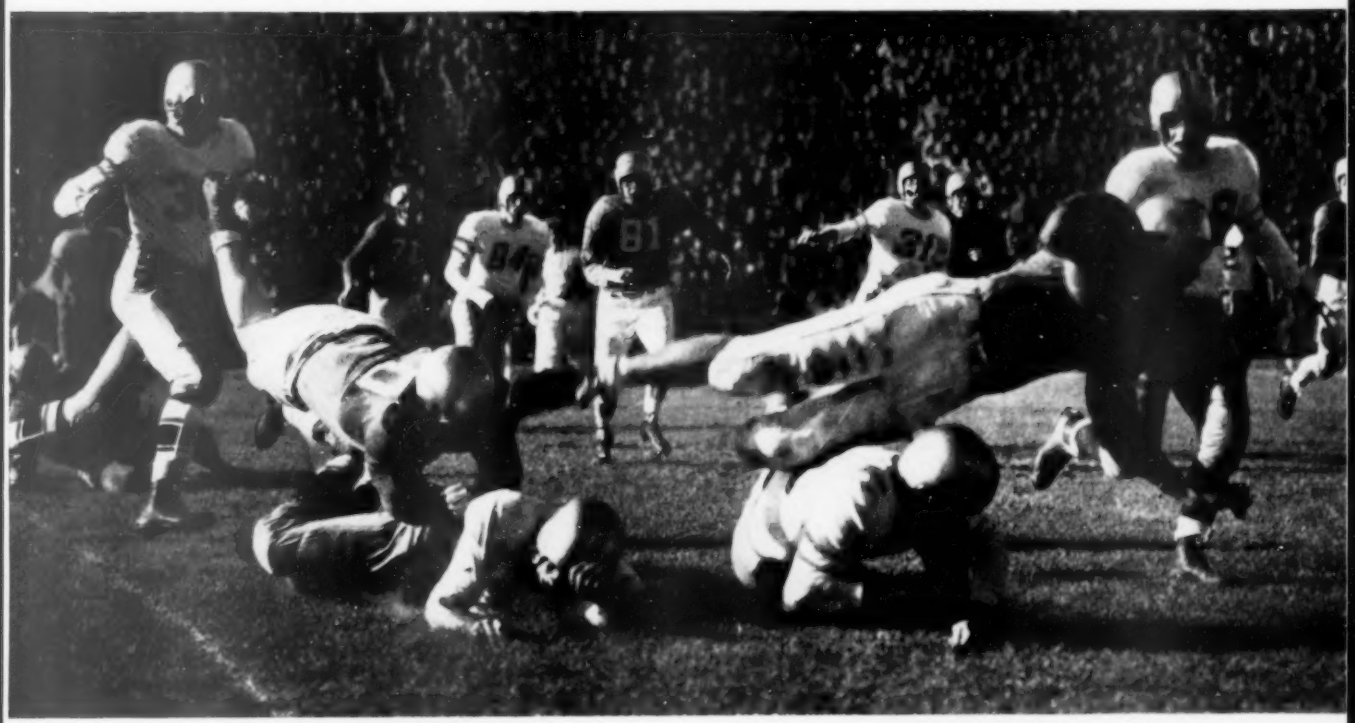
Earlier this month a new Super Pressures Unit was dedicated at Northwestern University's Ipatieff Catalytic and High Pressures Laboratories with the dedicatory address being delivered by David S. Taylor, president of Universal Products Corp. and an associate of the late Prof. V. N. Ipatieff (The Oil and Gas Journal, November 23, page 146). Shown here is the unit's control panel which operates the autoclaves. Chemical reactions take place in the autoclaves, one of which is shown at the right, and can be conducted at temperatures up to 1,000° F. and pressures of 25,000 psi.

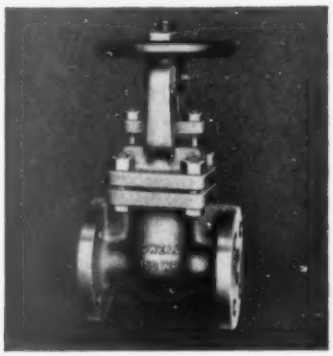
STAR PERFORMERS

From coast to coast, Powell Valves have won enthusiastic approval. For *every* Powell Valve is a *star for outstanding performance*. They have a record of dependability since 1846.

Small wonder that Powell Valves have made such a hit through the years. Powell has probably done more valve research, solved more valve problems and makes more types of valves than any other organization in the world.

We're sure that *you* will be enthusiastic about Powell Valves too once you see how they perform. Following are just a few members of the Powell all-star cast of valves which are available through distributors in principal cities. If a distributor is not located near you, just write us. We'll be pleased to tell you more about these valves—and our complete line.

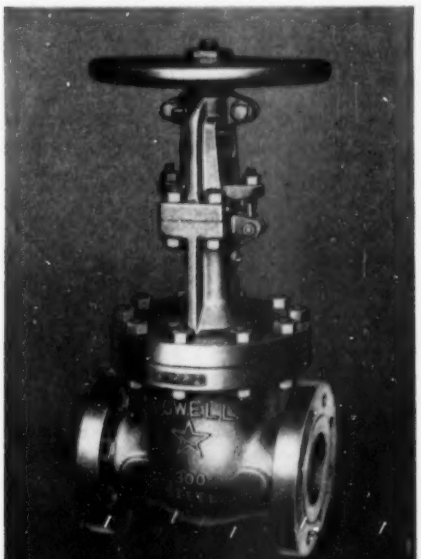




O.S. & Y. GATE VALVE *(Fig. 2491)* for 150 pounds W.P. at 500 F. Stem is threaded and guided through a revolving bushing in upper yoke. Sizes ¼" to 2", inclusive.

BRONZE "WHITE STAR" GATE VALVE *(Fig. 295)* for 200 pounds W.S.P. Union bonnet with inside screw rising stem. Renewable "Powellium" Nickel-Bronze wedge.

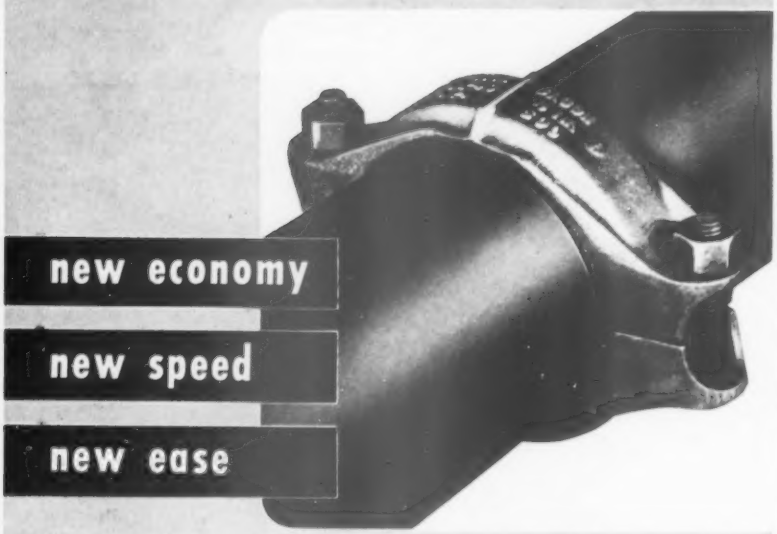
CAST STEEL GATE VALVE *(Fig. 3003)* for 300 pounds W.S.P. Bolted flanged bonnet with outside screw, rising stem and yoke. Sizes 1" to 24", inclusive.



CAST STEEL SWING CHECK VALVE *(Fig. 1561)* for 150 pounds W.S.P. Bolted flanged cap. Heavy rugged construction. Available in sizes ¾" to 18", inclusive.

P V

Now! Couple grooved pipe with



new economy

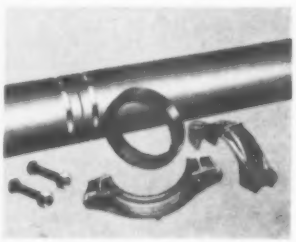
new speed

new ease

new GRUVAJOINTS

lightweight couplings for grooved pipe

GRUVAJOINTS — for grooved pipe systems carrying pressures up to 500 psi — cost considerably less than ordinary grooved pipe couplings. You get substantial freight savings, too, because **GRUVAJOINTS** weigh up to 45% less than conventional couplings.



Light and trim, **GRUVAJOINTS** are easy to apply and remove; easy to store; can be used over and over. They are made of malleable iron for 2", 3" and 4" pipe — protected with green rust inhibitor.

The **GRUVAJOINT** sealing gasket is interchangeable with those in **GRUVAGRIPS** (standard weight grooved pipe couplings). **GRUVAJOINTS** couple perfectly with **GRUVAGRIP FITTINGS.**

See new **GRUVAJOINTS** this week at your supply store!

FREE FOLDER

Write today for illustrated folder describing **GRUVAJOINTS** and other G-B pipe coupling products — **GRUVAGRIPS, GRUVAGRIP FITTINGS** and **ROLA-GRIPS** (for plain end pipe). Ask for folder CCF.

Gustin-Bacon Manufacturing Company

210 West Tenth Street Kansas City 6, Missouri

the refrigeration system in the alkylation unit.

CORPUS CHRISTI, Tex. — Southwestern Oil & Refining Co. reports it has pushed a new U.O.P. fluid catalytic cracking unit over 2,500 bbl. per day beyond its design capacity to meet increased demand for catalytic cracked products. The new unit, located at the company's 30,000 bbl. refinery here, is designed to charge at a rate of 5,740 bbl. daily at 50 per cent conversion. However, after the unit was revamped, it charged 8,170 bbl. per day and is now operating at 7,600 bbl. daily at 58 per cent conversion.

SANTA FE SPRINGS, Calif.— Rothschild Oil Co. here has become the first California independent refiner to place a Platformer on stream. The new unit has a daily capacity of 1,000 bbl.

IRVING, Tex.—Petrocarbon Chemicals, Inc., has contracted with Houdry Process Corp. for the licensing of a 1,000-bbl. per day Houdriforming unit to be built at its new chemical plant. The unit will be used to produce aromatic fractions from petroleum naphtha for end use as solvents.

LOS ANGELES.—New all-time high in crude runs to stills was recorded by Union Oil Co. during the first 9 months of the year. Crude throughput at its Wilmington and Oleum, Calif., refineries averaged 142,100 bbl. daily. This compared with the 9-month 1952 average of 137,100 bbl. daily. Due in part to the higher prices prevailing for crude and refined products since last February, and in part to the increased yields of higher quality and more valuable products, a substantial improvement in average sales realization per barrel was reported.

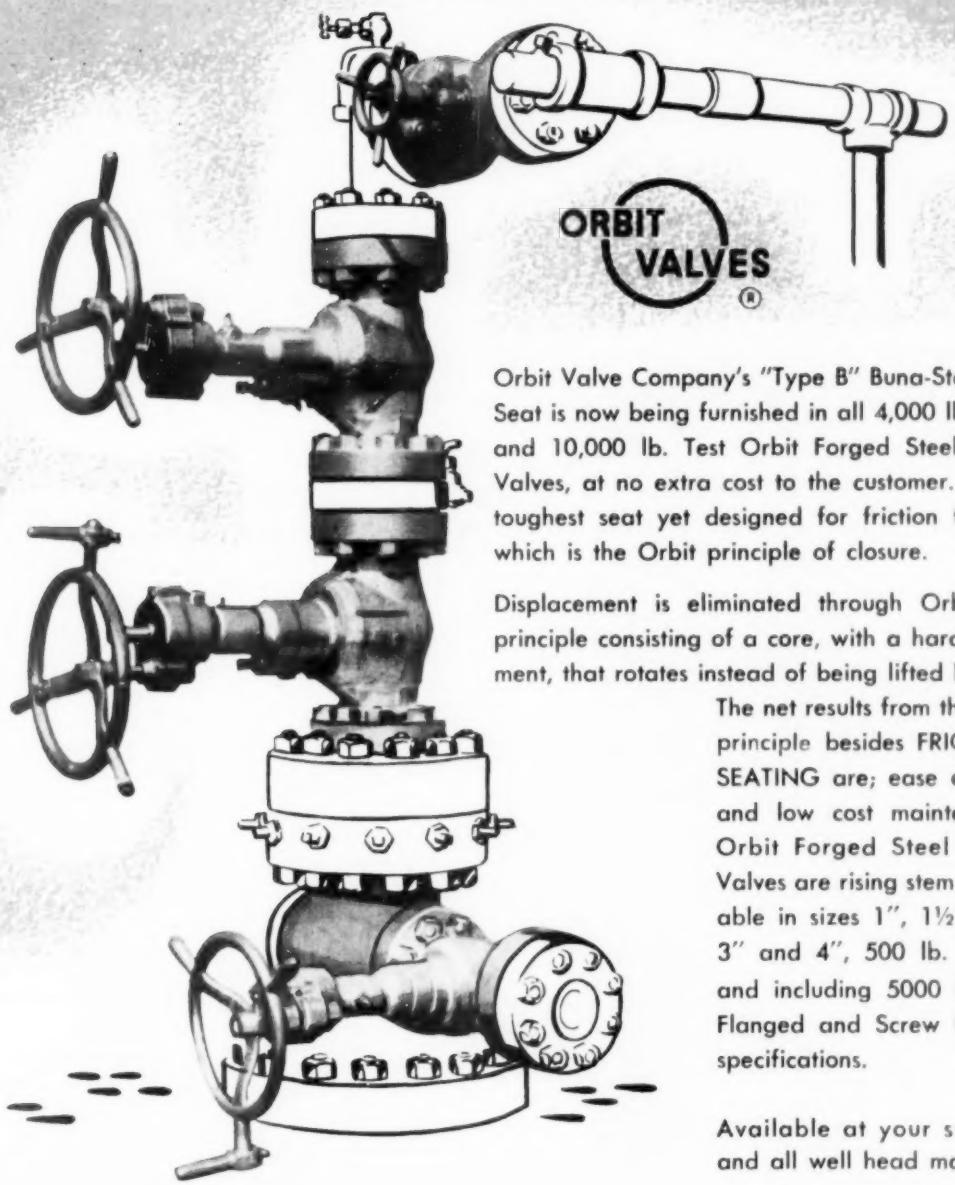
Petrochemicals

Brea Plans Dry Ice Plant

LOS ANGELES.—Brea Chemicals, Inc., a Union Oil Co. of California subsidiary, plans to construct a dry ice plant east of Brea in Orange County, California.

The proposed plant will be located near Brea's new ammonia plant, now under construction, which will supply the new facility with carbon dioxide for production of dry ice and liquid and gaseous carbon dioxide. Construction is expected to start immediately after necessary permits are obtained with completion date set for next summer.

SO LITTLE TO
PROTECT
SO MUCH



Orbit Valve Company's "Type B" Buna-Stainless Body Seat is now being furnished in all 4,000 lb., 6,000 lb. and 10,000 lb. Test Orbit Forged Steel Production Valves, at no extra cost to the customer. This is the toughest seat yet designed for friction free seating which is the Orbit principle of closure.

Displacement is eliminated through Orbit's seating principle consisting of a core, with a hard faced segment, that rotates instead of being lifted by the stem. The net results from this operation principle besides FRICTION FREE SEATING are; ease of operation and low cost maintenance. All Orbit Forged Steel Production Valves are rising stem type. Available in sizes 1", 1½", 2", 2½", 3" and 4", 500 lb. W.O.G. to and including 5000 lb. W.O.G. Flanged and Screw Ends, A.P.I. specifications.

Available at your supply store and all well head manufacturers.

BRANCHES

HOUSTON, TEXAS
407 Velasco
(Serving the Gulf Coast)

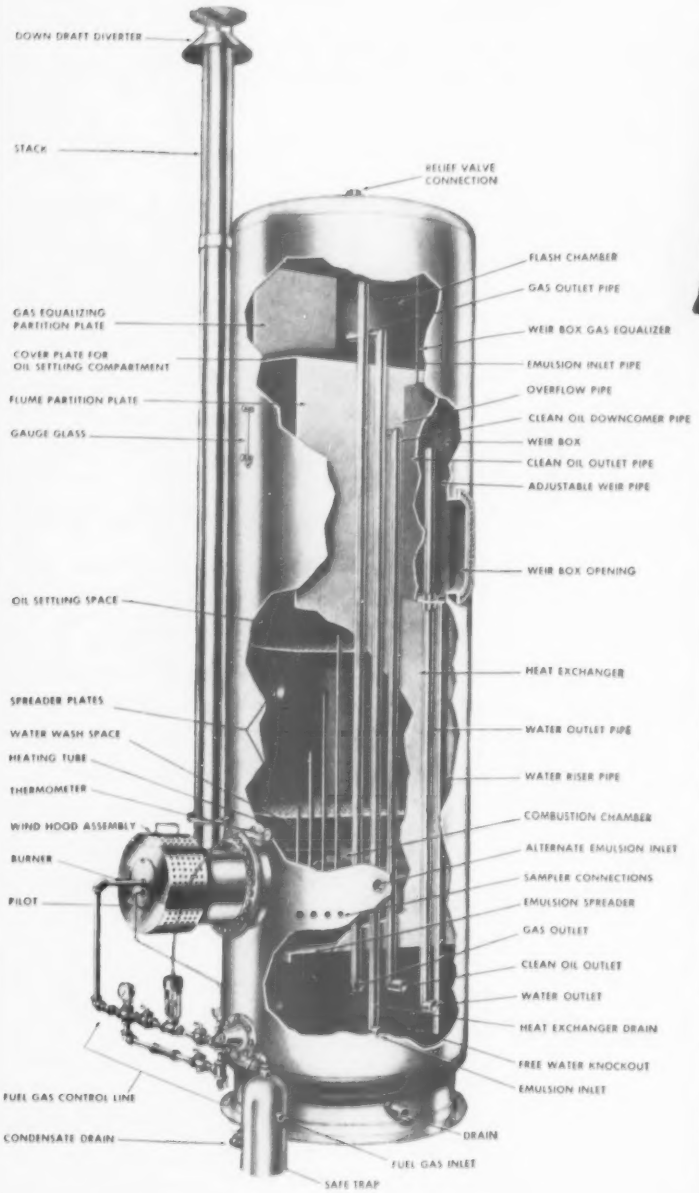
ODESSA, TEXAS
402 West County Road
(Serving West Texas)

CASPER, WYOMING
1740 E. Yellowstone
(Serving the Rocky Mountain States and Canada)

ORBIT VALVE COMPANY

P. O. BOX 699 TULSA, OKLAHOMA

NOW! YOU CAN FORGET TREATER TROUBLES IN COLD CLIMATES



PARKERSBURG NEW WINTERIZED TREATER

We've designed this NEW WINTERIZED TREATER so that ALL PIPING, INCLUDING THE WEIR BOX, is inside the treater.

This means:

. . . the inlet and discharge pipes, rising to top of treater, reduce radiation loss, always a treater problem in cold climates.

. . . discharge water won't freeze because weir box and water discharge pipe are inside treater.

. . . easier housing of all controls because piping connections are grouped close to firebox.

. . . additional pre-heating of the emulsion as it rises through the inside inlet pipe to top of treater before spilling over and flowing down the flume.

. . . the rearranged fire tube provides increased water capacity with less heat loss to the water.

Ask your Parkersburg Representative or write for complete details about our Winterized Emulsion Treater . . . the perfect solution to emulsion treating in cold climates.

5322

PARKERSBURG
PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

Among the

Drilling Contractors

Geary Joins Schick in Abilene Drilling Firm

DAVID H. GEARY

David H. Geary, formerly associated with Henson Drilling Co., Abilene, Tex., has joined J. B. Schick, independent drilling contractor, also of Abilene.

They, currently, are operating two rotary rigs in the North Central and West Texas areas. One rig has a depth-capacity rating of 6,500-ft.; the other 4,500 ft.

Cecil T. Lee, headquartering at Abilene, is tool pusher.

Whitehurst Drilling Co., Shreveport, has a contract with Carl L. Bryan, of Shreveport, for a 5,200-ft. wildcat test to be drilled at 1 Futrell-Cain, in 36-7n-1w, about 1½ miles northwest of Pollock, in Grant County, Louisiana.

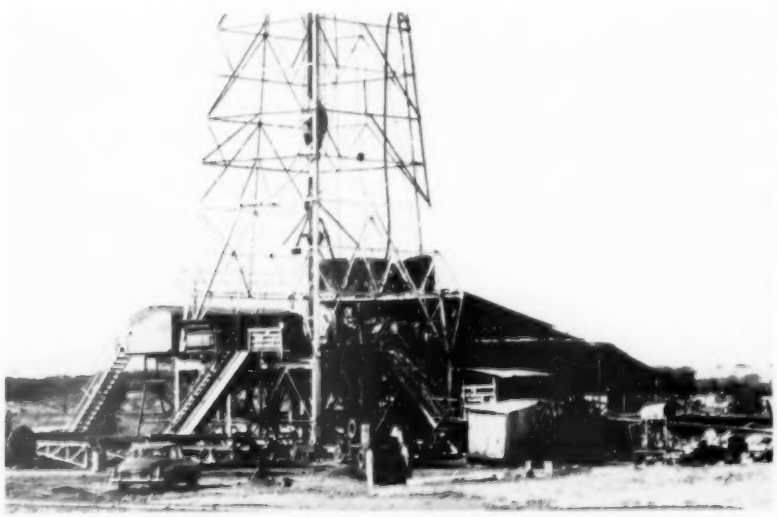
Longhorn Drilling Corp., Three Rivers, Tex., has contracted to drill a 7,500-ft. well for Warren Petroleum Corp. at 1 Magee, in North Agua Dulce field, a mile east of Banquete, in Nueces County, South Texas. It also has a rig working on a 13,000-ft. wildcat test for Henderson Coquat, S. A. Guiberson, Jr., and associates at 1 Dillon, 4 miles southwest of Catarina, in Dimmit County, Southwest Texas.

Columbia Drilling Co., Houston, is scheduled to drill a 10,000-ft. Frio test 6 miles northeast of Taft, In San Patricio County, South Texas. Contract is with Cities Service Oil Co. The test will be listed as 1 Elzner. Location is 2½ miles northwest of Harvey field.

Justiss-Mears Drilling Co., Jena, La., has contracted for a 9,200-ft. Tuscaloosa test to be drilled for Carter Oil Co. in Tensas Parish, eastern Louisiana. Location is for 1 Prudential, in 21-11n-12e, a mile south of St. Joseph.

McFarland Drilling Co., Corpus Christi, is moving a rig to a wildcat location northwest of North Agua Dulce field, Nueces County, for a 7,500-ft. test to be drilled for C. G. Glasscock. Location is for 1 Wright, in the Vicente Lopez de Herrera Grant.

T. J. Conway Drilling Co. has a rig working for A. R. Temple, of Biloxi, Miss., on a newly started wildcat test in Franklin County, in the southern part of the Florida panhandle. The test is the operator's 1 Lister. Location is about 2 miles northwest of Carrabelle,



One of the two large drilling assemblies Peake Drilling Co., of Wichita, Kans., is operating under contract for Woodward & Co. and Mendota Oil Co. in development of deep, lower Simpson sands in the South Goldsby area, in McClain County, Central Oklahoma. Productive horizons in the area are encountered at depths of from 9,500 to 10,000 ft. The pictured rig is a National 100 assembly, powered by four LRO Waukesha engines.

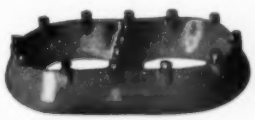
RE: OIL WELL CASING

WHY WAIT

for the log jam to break? Is your casing order buried in the backlog? The cost of converting casing and pipe is down. We can supply big tonnage on short notice. We have furnished casing, pipe, etc. to some of the largest oil companies in the country and will be glad to exchange references.

Write, wire or phone us for your casing needs.

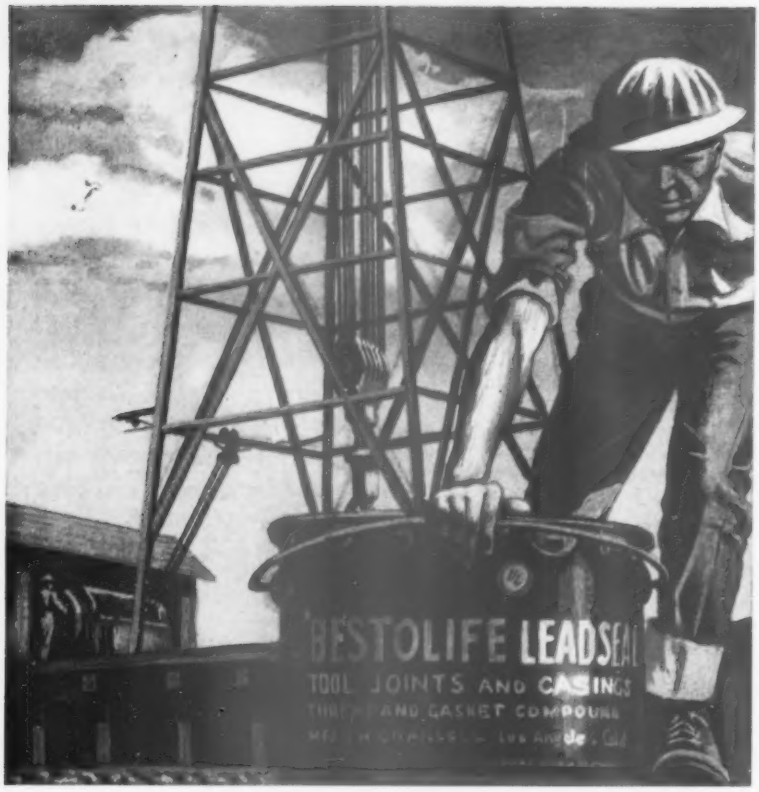
WILLIAM S. GEORGES AND ASSOCIATES
924 First National Bank Building
Canton, Ohio
Phone 6-8171



Get High Boiler Capacity with Short Stack

Inferno Streamlined Stack Blower is mounted in the base of the stack. Steam from the boiler is blown from the fifteen stainless steel nozzles up the stack, inducing a terrific draft. The result is high boiler capacity, up to 400%. Stack blower body is malleable iron capable of withstanding rough oil field usage. Write for Bulletin 22-A.

THE INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.



Unconditionally Guaranteed

Your drill strings literally hang by a thread, so get the thread compound that is unconditionally guaranteed to give efficient sealing, protects against galling and seizing, allows easy break-out . . .'Bestolife Lead Seal Tool Joint and Casing Compound. The Standard of the Oil Country for over 20 years. Sold at supply houses throughout the world. Packed in 1¼, 5, 20 and 50 lb. containers.

I. H. GRANCELL
1601 E. NADEAU STREET, LOS ANGELES 1, CALIF.

WHERE THERE'S MOISTURE THERE'S BESTOLIFE

in 14-7s-5w. Objective is the Lower Cretaceous, expected around 5,000 ft.

Vasser & Brown, Inc., Natchez, Miss., is drilling a Wilcox test for R. A. Campbell, Vidalia, La., independent operator, at a wildcat location 2¾ miles northeast of Dunbarton, in eastern Catahoula Parish. The test, 1 Vestal, in 15-9n-8e, is projected to 7,000 ft.

Sutton Drilling Co. has contracted for a 5,200-ft. wildcat test to be drilled a mile northeast of Los Angeles, in northeastern LaSalle County, Southwest Texas. Operator is J. E. Mowinkle, and the test, 1 Perrow, in Survey 10.

Petersen Drilling Co., Shreveport, is contractor and joint operator with J. Paul Ratliff, Jr., at a new wildcat operation, 1 Bufkin, located in 40-5n-1e, a mile southeast of Knoxville, in southwestern Franklin County, southern Mississippi. Hole is projected to 7,000 ft.

Crescent Drilling Co., Monroe, La., has a contract with Republic Natural Gas Co. for another deep test the latter has projected for the Colquitt area, in northern Claiborne Parish, northern Louisiana. Location of the test, listed as 1 Monk, is approximately a mile west of Republic's indicated Smackover lime discovery well, 1 Martin & Cain et al. The latter well, now being deepened, got a good flow of gas and a substantial recovery of condensate in a drill-stem test at 10,117-62 ft. in Smackover lime.

Bagley Drilling Co., Shreveport, has a new Tuscaloosa test under way in southwestern Bienville Parish, northern Louisiana. The test, 2 Lacy, located 2 miles south of Roy, in 14-14n-8w, is a joint operation of the contractor and C. O. Day, also of Shreveport.

Lavaca Drilling Co. has a contract with Carrl Oil Co. and Petrocel Corp., of Corpus Christi, for a 6,200-ft. test to be drilled at a wildcat location at 1 Glover, 6¾ miles northwest of Refugio, in the J. Sinnot Survey, in western Refugio County, near the Bee County line, South Texas. The contractor will use a rig which now is engaged on a wildcat test being drilled for the same operators in Victoria County.

Fortenberry Drilling Co., Natchez, Miss., is scheduled to drill another well for J. Willis Hughes in Sunnyside field, Jefferson County, southern Mississippi. Its rig, which has just completed Hughes' 3 Logan & Shields as one of the best wells in the field, is now on 3 Hall.

How SUNRAY OIL boosts pipe line capacity 25%

Three years ago production skyrocketed at the Sunray Oil Corporation refineries in Duncan and Allen, Okla. Expansion throughout the system overloaded the 6-inch pipe line between the two cities. Bigger pipe was not available.

Sunray engineers hit on a cost-cutting solution—installed three electrically powered booster stations between regular pumping stations. They know that electric motors cost less to install . . . require little maintenance . . . are easily adapted to remote control circuits.

Then engineers selected an RCA 960-mc Microwave radio-relay system to effect complete remote control of the *"boosters"* from regular pumping stations. Microwave stations spaced miles apart proved cheaper to install and maintain than direct wire. And Microwave systems are virtually weatherproof.

When the Sunray microwave-operated *"boosters"* were put in operation on January 31, 1952, *the pipe line's capacity immediately increased 25 per cent!*

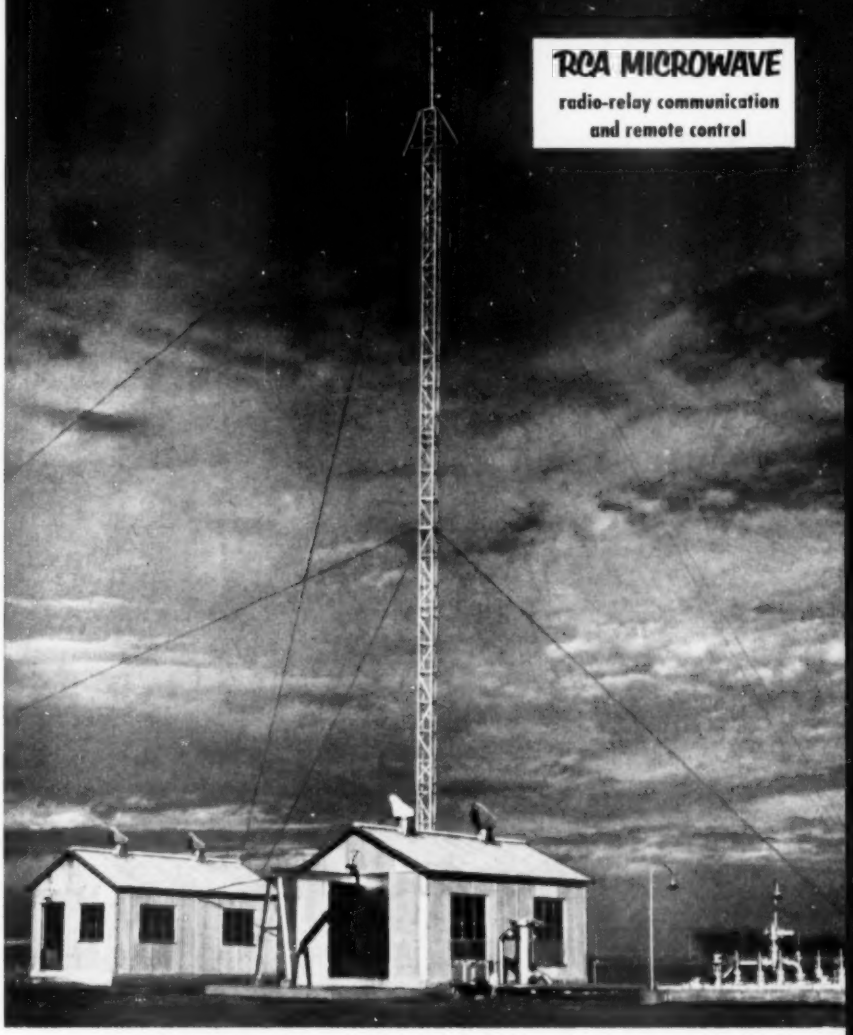
RCA Microwave "beams" highly directional radio signals from station to station by "dish" antennas. Since 1946 RCA has installed many fully reliable Microwave systems, some over 1,000 miles long. *All have proved themselves in performance*—for utilities, government agencies, telegraph companies, turnpikes, as well as pipe lines.

In addition to remote control and supervisory functions, RCA Microwave provides as many voice and teletype channels as you need—and does it with a minimum of frequency space. It employs readily available tubes and familiar circuits which are easy to service. It interconnects with your telephone lines and switchboards.

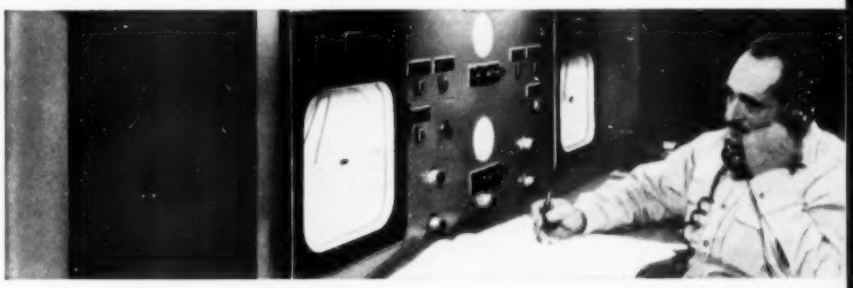
If you desire, RCA supervises survey, construction and installation—offers a complete single-source, single-responsibility service. And only RCA can provide the nationwide service facilities of the RCA Service Company.

For more information, mail the coupon ▶

RCA MICROWAVE
radio-relay communication and remote control



Unattended booster station at Pernell, Okla. Radio-beam signals via RCA Microwave operate the booster by full remote control. Maintenance man inspects each station once every 24 hours.



Telemeter charts give continuous record of power and pressures at boosters. Operator remote-controls valves and pumps of booster stations. Signal lights indicate equipment failure and emergency generator operation. 2-way voice channel contacts maintenance personnel.

RADIO CORPORATION of AMERICA
COMMUNICATIONS EQUIPMENT — CAMDEN, N. J.

Dept. 89 WB, Building 15-1

Without obligation on my part, please send me your free booklet on:

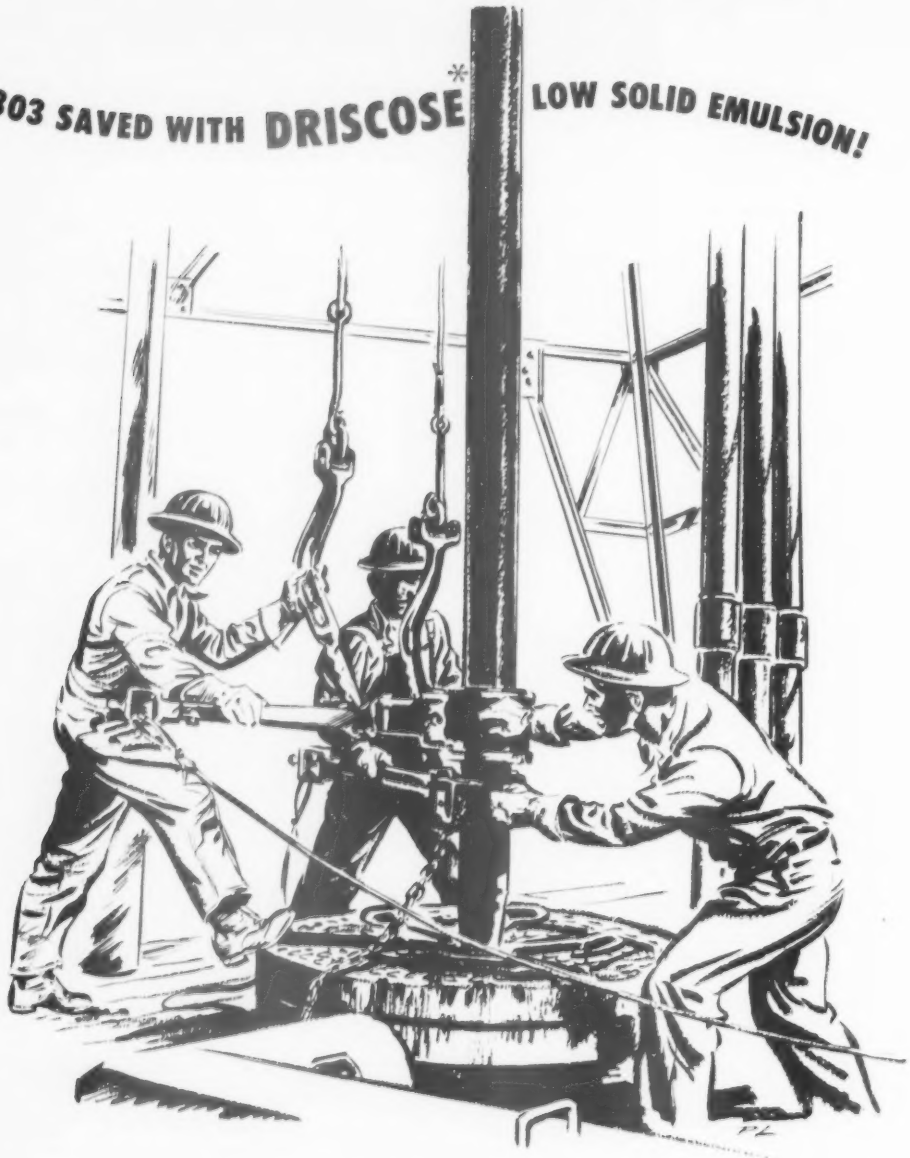
☐ A Booster Station Microwave System ☐ Pushbutton Operation of Boosters

Name _____ Title _____ Company _____

Address _____ City _____ Zone _____ State _____

☐ Have an RCA representative get in touch with me.

$23,303 SAVED WITH DRISCOSE* LOW SOLID EMULSION!



Consistent for high performance, **DRISCOSE** low pH, low solid emulsions help drillers get the best possible penetration. In West Texas a recent case history with low solid, low pH **DRISCOSE** emulsion revealed a saving of 28.5% in drilling days, with a 16.6% saving in number of bits used . . . resulting in a saving of $23,303.

DRILL WITH

DRISCOSE*

DRILLING SPECIALTIES COMPANY

BARTLESVILLE, OKLAHOMA

*DRISCOSE is a trademark for Sodium Carboxymethylcellulose.

EXPLORATION

Palo Duro Basin Drilling Next?

by Carl Hoot

DRILLING of The Texas Co., Stanolind Oil & Gas Co. and John Murchison 1-98 Union Compress & Warehouse within the Littlefield townsite in south-central Lamb County has been followed with considerable interest. Its effects on future exploration in an almost untried geologic province will bear watching.

The well did not establish pre-Permian production, but was plugged back to 4,290 ft. and completed as 121-bbl. pumper from perforations between 3,952-84 and 4,000-20 ft.

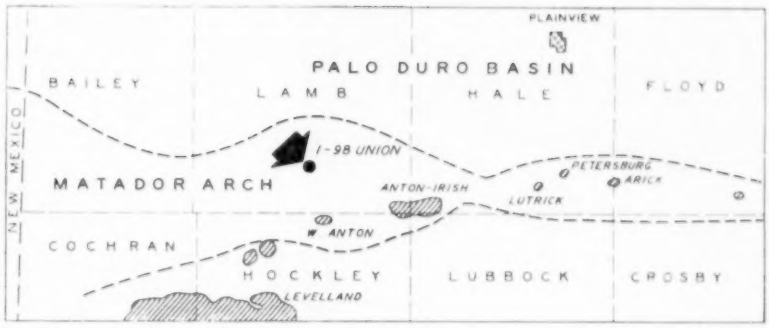
Pay zone in 1-98 Union is probably San Andres as that group has a relatively thick section at that point. This conforms with wells used as control points on a north-south axis (running slightly northwest) from Anton Irish pool at the south end to a point approximately 140 miles north to the Bravo dome and Amarillo uplift, where the pre-Permian pinches out.

As such a producer, it adds another oil-bearing structure to the group of small pools found along the east-west trending Matador arch. These pools, shown on the accompanying map, include West Anton and Anton-Irish. They produce from the Yeso (Clear Fork) section. Also included along this archipelago of structures are Lutrick and Petersburg (Pennsylvanian) pools in southeast Hale County.

Operators of the 1-98 Union have not had sufficient time to digest the geologic information gained in drilling this well. From previously known geological data, its top on the San Andres around 2,970 ft., datum point of plus 583 ft., conforms to the data from control wells on the south end of Palo Duro basin, and its total depth of 9,842 ft. should be in or near the pre-Cambrian granite.

No shows were reported in the lower horizons while drilling. One drill-stem test was made below the Permian, and that from 9,649-9,842 ft. The testing tool was open 1½ hours, which recovered 345 ft. of drilling mud.

Importance of the well lies not so much in its discovery of another pool along the buried Matador arch, but in its possible effect on future exploratory drilling on the south flank of the Palo Duro basin, (the eastern portion of the Plainview basin).



The Matador arch is a series of uplifts crossing the southern end of the Texas Panhandle. It is believed to be a westward continuation of the Red River uplift and the Electra arch. Permian rocks cover the whole area and constitute more than half of the total volume of sediments. Average thickness of sedimentary rocks is 8,000 ft. and maximum thickness is about 11,000 ft.

Geologists are of the opinion that of the pre-Permian sedimentary rocks, Pennsylvanian formations are the most favorable for the occurrence of oil in the Palo Duro basin. Lutrick, Petersburg, and two other small pools to the east produce from a reef limestone of Pennsylvanian age. The Palo Duro basin, where black shales may be both source beds and seals for oil in reefs, appears the most promising portion of the Plainview basin. Geophysical prospecting is deemed the most feasible means of locating a buried structure in this basin.

References: Possible Future Petroleum Provinces of North America, Plainview Basin, Texas and New Mexico, West Texas Geological Society.

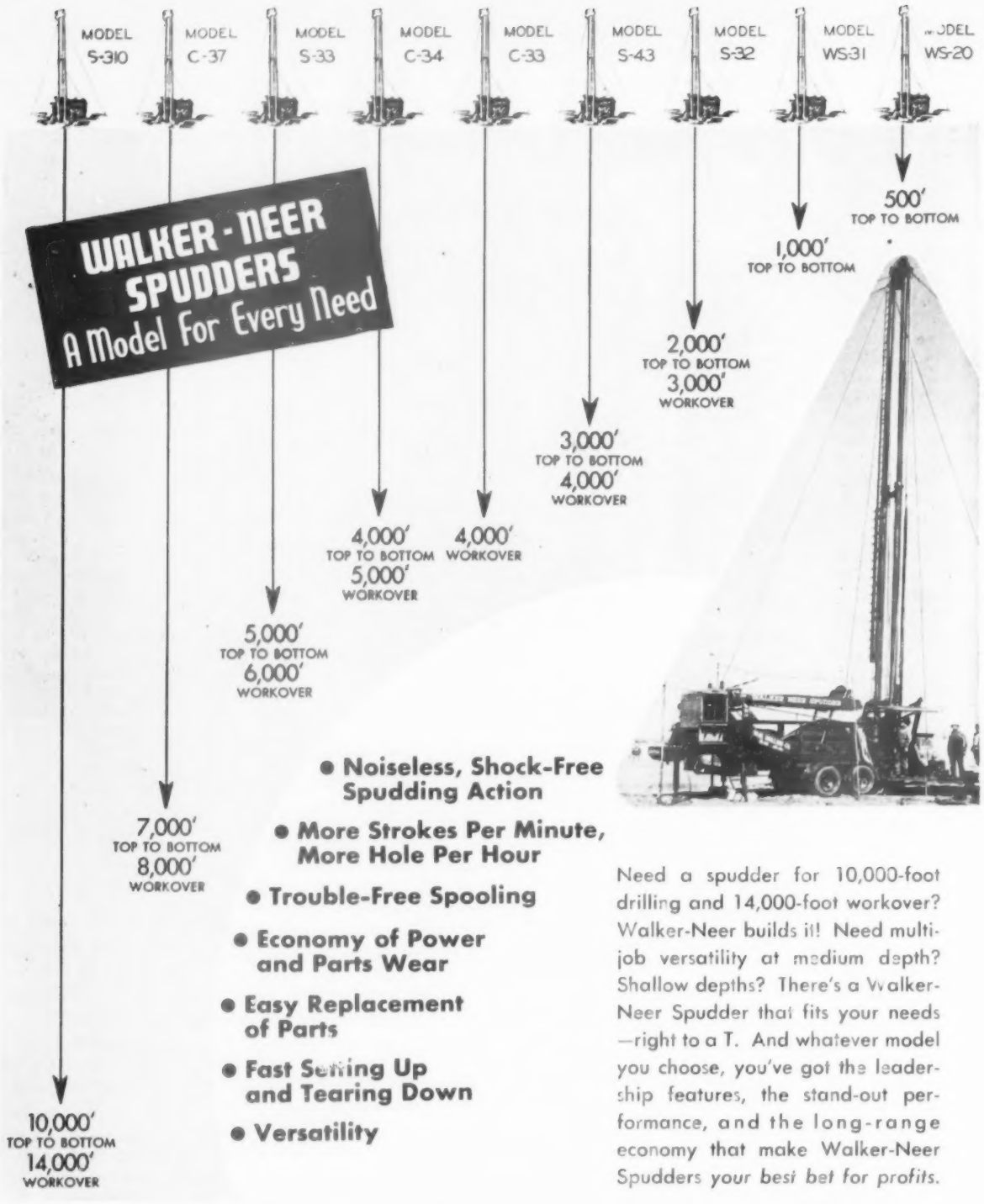
HIGHLIGHTS OF WEEK'S DEVELOPMENTS

COLORADO . . . The Texas Co. recovered 3,240 ft. of oil in 5 hours on test of the Shinarump at 5,303-18 ft. at 14 Knowlton, Lot 5, 9-4n-91w, Moffat County. The discovery is a deep test in the previously producing Moffat Dome field.

OKLAHOMA . . . The second well in new North Jarvis pool in Grant County is being placed on production. Union Oil Co. of California and Sun Oil Co. 1 Dickey, SE SE NE 29-29n-6w, flowed an average of 8 bbl. of oil per hour cutting 5 per cent water on a ½-in. choke.

WEST CENTRAL TEXAS . . . Possible extent and importance of Cambrian pay in White Flat field of northeast Nolan County has been shown by a second prolific producer in the field from that pay horizon. Honolulu Oil Corp. 2 Whitaker, south offset to Cambrian pay, flowed 80 bbl. of oil in 35 minutes or at the rate of about 3,300 bbl. per day, on drill-stem test at 5,576-5,605 ft.

WYOMING . . . McElroy Ranch, Natural Gas & Oil Co., and Bruce Anderson have recovered Shannon gas at their 1 Horne, SW NW NE 11-20n-79w, 2 miles south of Big Medicine Bow field in Carbon County. The wildcat is slated to go to the basal Sundance, the pay zone in Big Medicine Bow field proper. Operators cored 63 ft. of saturated sand and recovered the gas on drill-stem test.


MODEL S-310
MODEL C-37
MODEL S-33
MODEL C-34
MODEL C-33
MODEL S-43
MODEL S-32
MODEL WS-31
MODEL WS-20
WALKER-NEER SPUDDERS
A Model For Every Need
500' TOP TO BOTTOM
1,000' TOP TO BOTTOM
2,000' TOP TO BOTTOM 3,000' WORKOVER
3,000' TOP TO BOTTOM 4,000' WORKOVER
4,000' TOP TO BOTTOM 5,000' WORKOVER
4,000' WORKOVER
5,000' TOP TO BOTTOM 6,000' WORKOVER
7,000' TOP TO BOTTOM 8,000' WORKOVER
10,000' TOP TO BOTTOM 14,000' WORKOVER
• Noiseless, Shock-Free Spudding Action
• More Strokes Per Minute, More Hole Per Hour
• Trouble-Free Spooling
• Economy of Power and Parts Wear
• Easy Replacement of Parts
• Fast Setting Up and Tearing Down
• Versatility

Need a spudder for 10,000-foot drilling and 14,000-foot workover? Walker-Neer builds it! Need multi-job versatility at medium depth? Shallow depths? There's a Walker-Neer Spudder that fits your needs—right to a T. And whatever model you choose, you've got the leadership features, the stand-out performance, and the long-range economy that make Walker-Neer Spudders *your best bet for profits.*

WALKER-NEER

MANUFACTURING COMPANY, INC.

P. O. BOX 2490 WICHITA FALLS, TEXAS

WALKER-NEER SPUDDERS AROUND THE WORLD

DISTRIBUTORS: Oil Well Supply Company • Bovaird Supply Company • Jones & Laughlin Supply Company • Mountain Iron & Supply Company • E. D. Taylor Company • Acme Well Supply (exclusive export agent except on North American Continent)

Wildcat Completions, October 1953

	Total	Oil	Gas	Dry	Footage	1953 Total comp.	1953 Cum. (1,000 ft.)	1952 Total comp.	1952 Cum. (1,000 ft.)
Kansas	78	4	1	73	305,994	759	2,877	715	2,789
Oklahoma	54	8	2	44	238,636	650	2,849	608	2,841
Texas	402	56	10	336	2,069,388	4,461	21,957	4,124	19,733
North Central	158	25	0	133	605,128	1,809	6,487	1,790	6,050
West	68	14	1	53	437,545	738	4,441	744	4,392
Panhandle	1	0	0	1	4,116	21	107	63	394
East	16	3	0	13	84,207	251	1,275	212	1,151
Gulf Coast	77	7	7	63	527,966	751	5,359	599	4,473
Southwest	82	7	2	73	410,426	891	4,288	716	3,273
Louisiana	54	10	2	42	437,589	435	3,825	337	2,909
North	25	2	0	23	135,377	146	850	158	949
South	29	8	2	19	302,212	289	2,975	179	1,960
Mississippi	21	5	0	16	144,211	171	1,214	154	1,117
Arkansas	21	1	0	20	88,260	120	423	82	368
Nebraska	8	2	1	5	41,976	133	682	142	611
Rocky Mountain	77	6	4	67	395,051	576	3,190	411	2,140
Dakotas	13	2	0	11	69,571	82	443	35	224
New Mexico	20	4	3	13	127,632	139	916	137	923
California	51	7	3	41	242,687	546	2,629	493	2,288
Tri-States	103	1	0	102	191,343	839	1,646	1,144	2,400
Others	43	5	2	38	132,784	403	1,289	444	1,266
Total October 1953	945	109	28	808	4,485,122	9,314	44,025	8,826	39,609
Total September 1953	976	150	19	807	4,624,843				
Cumulative 1953	9,314	1,332	316	7,666	44,024,789	9,314	44,025		
Cumulative 1952	8,826	1,276	225	7,325	39,609,199			8,826	39,609

Wildcat Completions Drop Slightly in October

by John C. McCaslin

DESPITE the fact that total completions in the United States were at an all-time high in October, wildcat completions fell slightly from the previous month's figures. October totals caused the percentage gain over last year to drop to 5 per cent in cumulative wildcats drilled. However, all areas except Nebraska and the tristate region show an increase over 1952. Operators need to final 2,057 more tests to reach the 11,371 wildcats forecast for completion this year.

An indicated discovery in Florida highlighted exploratory news in October, while successful completion of an Ordovician new-pay strike in Hamilton Dome field in the Big Horn basin took first place in the Rocky Mountains. Two discoveries on the West Coast brought California back into the picture, one in the Coalinga area, and the other in Kings County.

Florida . . . Commonwealth Oil Co. and associates are continuing productivity tests at their prospective oil discovery, the 1 Wiseheart-State, 40 miles west of Miami in northwestern Dade County. If commercial production is established at this wildcat, the state will receive its second oil field. The tests are being made in a casing-perforated interval at 11,462-86 ft. in the Lower Cretaceous-Sunniland section, which is the pay at Florida's only oil field, Sunniland, 40 miles to the west.

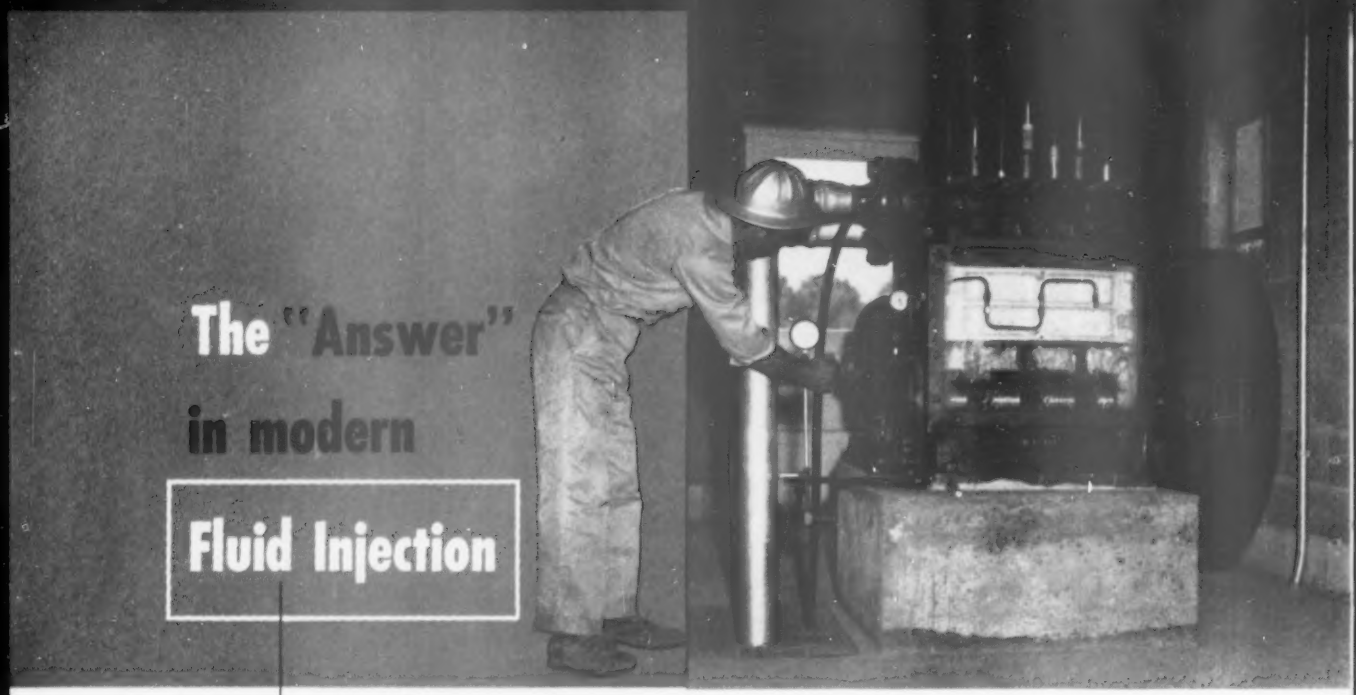
Sunniland field, opened in 1943 by Humble Oil & Refining Co., is located in northern Collier County. It has 12 producing wells, all but one of them on the pump. Wildcat activity in Florida has been heavy this year, particularly in the northwestern panhandle section of the state. The activity in this section of the state has been heavy since the opening of Pollard field in Escambia County, Alabama, about 2 years ago. Operators have completed 27 wildcats in Florida this year.

Big Horn basin . . . The first Ordovician well in Wyoming is being put on the pump at Argo Oil Corp. 51 Government, C SE SE 14-44n-98w, in Hamilton Dome field, Hot Springs County. The operator swabbed 500 bbl. of oil per day from the Big Horn dolomite of Ordovician age at 3,522-36 ft. Gravity of the oil is 13°-15°.

Previous production in Hamilton Dome field is from the Embar, Tensleep, and Madison. The field has produced more than 21 million barrels of oil since discovery in 1918. Activity in the biggest producing basin in the Rocky Mountain region has been heavy this year, particularly in the South Manderson area.

California . . . Although completed flowing only 300 bbl. of oil daily through a 16/64-in. choke, a new field discovery of Reserve Oil & Gas Co., about ¾ mile south of Pyramid Hills production in Kings County, on flow tests indicated it had much higher potentialities. The new 4,400-ft. discovery, in a Kreyenhagen sand of Upper Eocene age, is in an area of small producers. Faulting is believed to control production, the extent of which will probably be determined fairly rapidly.

A new field discovery was recorded by Lloyd Harnish, Opr. 73 "well" in Fresno County's Coalinga area, 1 mile south of Pleasant Valley production and 1¾ miles west of Guijarral Hills. Believed to be on the same nosing as the latter, production of 350 bbl. of oil daily was obtained from the Leda sand, lower Miocene, at a depth of about 8,400 ft. Two offsets were already under way at the end of the month, and an extension was being prepared about ½ mile southeast. All of the new activity is in 32-20s-16e.

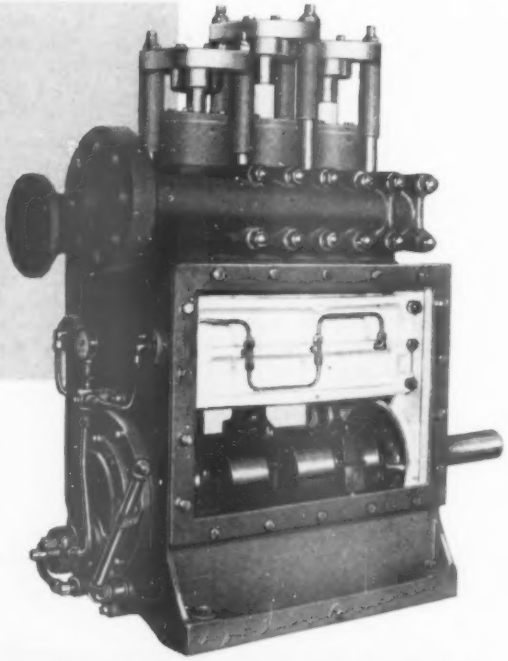


The "Answer" in modern

Fluid Injection

Ajax TP 4000 SERIES PUMPS

- COMPACT
- HIGHLY EFFICIENT
- GREAT DESIGN SIMPLICITY
- EASILY ACCESSIBLE
- UNIQUE LUBRICATION SYSTEM
- WIDE OPERATING RANGE



The specialized Ajax Triplex Pump gives you a range of pressures from 825 to 5000 psi and a maximum capacity of 4234 barrels per day—with engineering and construction of highest industrial standards. ● *Write for complete details in free Bulletin 531. Call your Supply Man.*

PESA PARTNERS IN PETROLEUM PROGRESS

AJAX

AJAX IRON WORKS

Builders of GAS AND OIL ENGINES, PRESSURE PUMPS, STEAM DRILLING ENGINES, INDUSTRIAL STEAM ENGINES

CORRY, PENNSYLVANIA

Oil Field Distributors: THE NATIONAL SUPPLY CO., PITTSBURGH, PA.
R. B. MOORE SUPPLY CO., BOLIVAR, N.Y. • BETHLEHEM SUPPLY CO., TULSA, OKLAHOMA

Completions Hit Record High

by John C. McCaslin

TOTAL completions in the United States in October set a new all-time high for any one month. The previous record was set last July. Operators finaled more than 4,700 wells, up 9 per cent over the previous month. Cumulative completions for 1953 show a 7 per cent gain over last year.

Oklahoma showed the biggest gain over the previous month. October was a record month in that state with more than 800 wells completed. Other high totals were recorded in Kansas, the Rocky Mountains, and Louisiana. Texas had the biggest drop. The phenomenal increase in Oklahoma drilling activity this year has been one of the primary factors in the completion records set in 1953.

One of the most active areas in the country this fall is Weston County, Wyoming, in the Powder River basin's Clareton-Black Thunder-Cheyenne River area. During October, Weston County activity accounted for more than 50 of the 300 rotaries active through the entire Rocky Mountain region, and interest in the southern portion of the county has spilled over into Niobrara County with a resultant increase in activity to a level considerably above that of recent years.

Shell Oil Co. completed the world's deepest producer at Weeks Island field in Iberia Parish on the Louisiana Gulf Coast. Shell's 2 Gonsoulin-Minville was completed through perforations from 17,260-17,306 ft. for 141 bbl. of oil and 3,293 M.c.f. of gas per day through a 11/64-in. choke.

The new record erases the mark set by Shell's 1 Weeks Gall Unit in the same field. Total depth of the record holder is 18,567 ft.—about 93 ft. short of the deep-drilling record for the state held by Magnolia Petroleum Co. in Allen Parish. Weeks Island field has more deep producing wells than any other field in the world. Shell alone has a dozen wells producing below 15,000 ft. in the field.

In the Denver-Julesburg basin The California Co. completed the confirmation well in new Black Hollow Permian pool, Weld County, for a pump gage of 320 bbl. of oil per day. The well produced from open hole in the Lyons sand at total depth, 8,958 ft. First Permian production in the basin was found in Keota field, and the recovery went heavily to water when the well was put on production. There has been no attempt to drill through the Lyons in the Black Hollow area to date, but at the Keota strike drilling went ahead to deeper zones.

SUMMARY OF COMPLETIONS, OCTOBER 1953

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
Ala.-Ga.-Fla.	10	3	0	7	0	4	5	0	0	1	60,469	15
Arkansas	64	22	0	42	10	36	17	1	0	0	257,616	45
California	216	162	5	49	50	89	47	12	16	1	1,001,110	250
Colorado	76	23	6	47	9	10	52	4	1	0	384,467	99
Illinois	257	129	0	128	95	162	0	0	0	0	663,893	408
Indiana	121	36	4	81	108	13	0	0	0	0	189,116	170
Kansas	478	222	41	215	67	392	19	0	0	0	1,607,898	390
Kentucky	124	48	19	57	106	18	0	0	0	0	225,838	110
Louisiana	352	196	24	132	100	55	47	68	66	16	2,188,435	361
North	178	101	13	64	96	39	35	6	2	0	574,998	131
South	174	95	11	68	4	16	12	62	64	16	1,613,437	230
Michigan	60	22	2	36	33	25	2	0	0	0	154,856	123
Mississippi	48	27	1	20	0	5	34	5	4	0	324,451	40
Montana	46	25	1	20	15	14	9	5	3	0	203,374	90
Nebraska	21	11	2	8	0	9	12	0	0	0	114,022	44
New Mexico	140	51	63	26	33	30	50	16	8	3	744,712	177
New York	70	35	0	35	70	0	0	0	0	0	98,000	75
North Dakota	32	20	0	12	0	9	0	22	1	0	230,512	35
Ohio	101	39	18	44	65	36	0	0	0	0	197,306	183
Oklahoma	819	508	31	280	304	386	82	45	1	1	2,689,790	1,103
Pennsylvania	172	65	33	74	136	12	24	0	0	0	367,348	180
Texas	1,346	742	68	536	319	496	355	129	31	16	6,166,359	1,192
North Central (7-B & 9)	544	298	2	244	221	200	120	3	0	0	1,869,587	316
West (7-C & 8)	268	188	3	77	27	103	82	29	15	12	1,496,018	368
Panhandle (10)	42	25	15	2	1	40	1	0	0	0	132,755	39
East (5 & 6)	79	46	11	22	6	39	27	7	0	0	388,368	104
Gulf Coast (2 & 3)	205	83	20	102	20	49	63	59	12	2	1,262,737	218
Southwest (1 & 4)	208	102	17	89	44	65	62	31	4	2	1,016,794	147
Utah	9	2	2	5	4	2	3	0	0	0	31,444	41
West Virginia	44	5	32	7	24	20	0	0	0	0	117,972	179
Wyoming	132	96	4	32	8	57	58	7	2	0	688,913	315
Miscellaneous	82	0	1	1	0	1	0	1	0	0	11,873	¶11
Total October 1953	4,740	†2,489	357	‡1,894	1,556	1,881	816	316	133	38	18,719,774	§5,636
Total September 1953	4,333	2,290	311	1,732	1,401	1,658	773	322	135	44	17,587,721	5,581
Cumulative 1953	41,144	21,353	3,210	16,581	12,632	16,777	7,200	2,980	1,190	365	166,931,014	
Cumulative 1952	38,561	20,003	2,695	15,863	11,922	15,348	6,833	3,036	1,134	288	157,953,086	
Western Canada	191	101	13	77	32	89	63	7	0	0	804,507	
Alberta	114	66	9	39	12	38	58	6	0	0	537,180	
Saskatchewan	61	25	3	33	13	43	4	1	0	0	219,453	
Manitoba	12	10	0	2	7	5	0	0	0	0	28,590	
British Columbia	4	0	1	3	0	3	1	0	0	0	19,284	
Western Canada, September	200	97	19	84	28	100	67	4	0	1	852,820	

*Incl. 129 service wells: Kans. 11, N. Y. 53, Ohio 6, Okla. 12., Pa. 65. †Incl. 34 condensate wells: S. La. 10, Miss. 3, Okla. 1, N. C. Texas 1, Texas Gulf 7, S. W. Texas 12. ‡Incl. all wells rigged up and/or drilling at month end. §Incl. 1 S. D., dry, 7,772 ft.; 1 Md., gas, 4,101 ft. ¶Incl. Idaho 1, Nev. 6, S. D. 4.

ROCKY MOUNTAIN

WYOMING

Carbon County Wildcat Finds Shallow Gas

McElroy Ranch Co., Natural Gas & Oil Co., and Bruce Anderson of Casper recovered 63 ft. of saturated sand in core of the Shannon sand at 1 Horne, SW NW NE 11-20n-79w, 2 miles south of Big Medicine Bow field, Carbon County. Drill-stem test 2,398-2,430 ft. had gas at the surface after 2 minutes. With tool open 30 minutes, the flow at the end of the test was estimated at 1,000 M c.f. per day. Pipe recovery was 100 ft. of gas-cut mud. Shut-in pressure was 900 psi. Total depth of the well is 2,505 ft., and the operators are running test on the zone 2,484-2,505 ft. The wildcat was scheduled as a basal Sundance test. Previous drilling in this area has found production in Sundance but has not reported shows in the shallower formations.

General Petroleum Corp. Completing Gas Discovery

General Petroleum Corp., is preparing to run casing at 18-20 Unit, SW SW SW 20-28n-113w, in the Tip Top area of Sublette County. The wildcat found gas in Frontier sands. On drill-stem test 7,225-61 ft. The recovery was at the rate of 1,400,000 cu. ft. per day. Top of Frontier was found at 6,172 ft.

The well was scheduled to test Beckwith at about 8,500 ft. It is about 2½ miles southwest of General Petroleum's Nugget discovery at 4-X-12-G, in 12-28n-114, which was completed in 1951 for a gage of 266 bbl. of oil per day.

COLORADO

Moffat Dome Deep Test Recovers Additional Oil

The Texas Co. tested a lower Shinarump zone at 14 Knowlton, Lot 5, 9-9n-91w for recovery of 3,240 ft. of oil in 5 hours. The well is a deeper pool test of the structure which has not previously been drilled below Entrada. An earlier drill-stem test made 2,650 ft. of free oil in 2 hours from the interval 5,273-5,301 ft. A test 5,330-47 ft. recovered 4,260 ft. of slightly oil-cut water. Total depth of the wildcat is 5,380 ft., with the operator running a new drill-stem test. The wildcat is scheduled to test Pennsylvanian.

Logan County "J" Sand Discovery Indicated

Trigood Oil Co. has recovered "J" sand oil from a wildcat between Merino and Sand Creek fields in Logan County. The well is 1 Whipple, C SW NE 12-6n-54w. Test was of the interval 4,760-92 ft., and there was gas at the surface after 13 minutes. Recovery was 840 ft. of oil and 420 ft. of salt water in 1 hour. Cores showed a total of 22 ft. of saturated sand. The well is at 4,792 ft. total depth, waiting on orders.

Morgan County Discoveries Near Completion

Petroleum, Inc., of Denver and Wichita, has completed 1 Clar, SE NE NW 24-1n-58w, Morgan County, for a flow of 12 bbl. of oil per hour, through open tubing. The well found production in "D" sand at 5,650-58 ft. Top of the sand was logged at 5,637 ft. The operator is coring at 5,600 ft. at a second well in the area, 1 H. J. Clar, SW SW SE 13-1n-58w.

To the east of the Petroleum, Inc., discovery, Creslenn Oil Co. of Dallas is preparing to complete 1 State, SE SE SE 16-1n-56w, which also made apparently commercial quantities of oil on test of the "D" sand. This operator has also made location for a second well in the area.

Bill Tomberlin of Denver is preparing to perforate for completion at 1 Cochran, SE SE NW 12-1n-58w. The wildcat showed a reported 28 ft. of saturation in "J" sand, and flowed oil after 50 minutes of a test of the interval 5,659-90 ft.

The southwestern Morgan County area has had relatively little drilling during the current exploration and development of the Denver-Julesburg basin. The area in which the three discoveries above are located is immediately northwest of the Little Beaver-Badger Creek areas of Washington and Adams counties, and promises to become an area of heavy activity similar to that which has been in effect in the Little Beaver area.

New Southeastern Colorado Wildcat Staked

Amerada Petroleum Corp., and British-American Oil Producing Co. have spudded 1 New, SE SE NW 33-32s-41w, in Baca County. The well is southeast of other current ex-

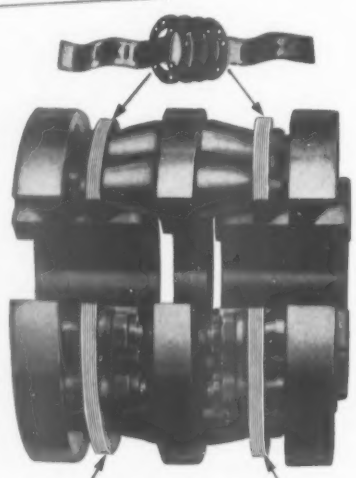
AVOID COSTLY SHUT-DOWNS!

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Specify THOMAS Flexible Couplings for Power Transmission

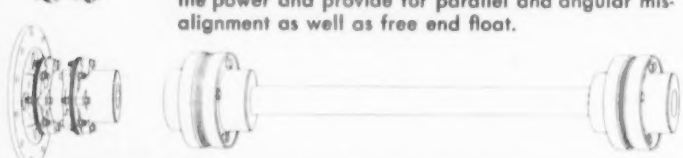
REFINERS! PIPE LINE MEN! DRILLING ENGINEERS! LABORATORY TECHNICIANS!

You can use Thomas Couplings to your advantage on Pumps, Compressors, Cooling Towers, Rigs or any other tough job where continuous operation and dependability are required.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

ploration of this county now under way by Southwestern Exploration Co.

Southwestern Exploraiton has landed casing for tests of unreported shows in Lansing and Topeka at 1 State, SW SW NE 16-30n-42w. Casing was landed at 3,650 ft. Total depth of the wildcat is 5,650 ft.

NEBRASKA

Two Cheyenne County Discoveries Indicated

Anschutz Drilling Co. recovered 450 ft. of mud-cut oil on 1½-hour test of 1 Wenkleman, C SW SE 34-17n-51w, Cheyenne County. Test was of the "J" sand interval 5,072-96 ft. Flowing pressure on the test was 0-250 psi. Six to 8 ft. of apparently productive section was cored from the well, according to the operator.

In the Cook area of this county, Pubco Development, Inc., recovered 600 ft. of free oil and 450 ft. of heavily oil-cut mud from the "D" sand at 2 Franzen, SE NW 25-15n-48w. Test was at 4,305-11 ft., and packer failed after 12 minutes. The operator is running casing on the basis of the short interval recovery.

MONTANA

Another Chouteau County Wildcat Abandoned

Continental Oil Co. has abandoned 1 Lennington, SW NW NW 24-27n-7e, in the Goosebill are of Chouteau County. The well is the third recent abandonment in this township. Total depth was 2,788 ft. with top of Madison called at 2,735 ft. Cores of this formation recovered saturated limestone, but salt water was recovered on test following acidization.

Wildcat Staked in East Poplar Area

C. W. Williams of Williston North Dakota has made location for 1 Dupree, C SW NW 36-29n-51e, about 3 miles east of production in East Poplar field, Roosevelt County. The well will test to Madison. It is the first well immediately to the east of production in the field proper.

NORTH DAKOTA

Renville County Gas Discovery Completed

Leach and Kelsch of Bismarck have completed five shallow gas tests in the Mohall area of Renville County. Four of the ventures were not productive. The fifth was a small gas discovery at 302-303 ft. The successful well is 1 Brudvik, NW SW 21-161n-84w. Initial production was 70,000 cu. ft. of gas per day. Operators have shut in the well. No further drilling has been planned for the area.

MICHIGAN

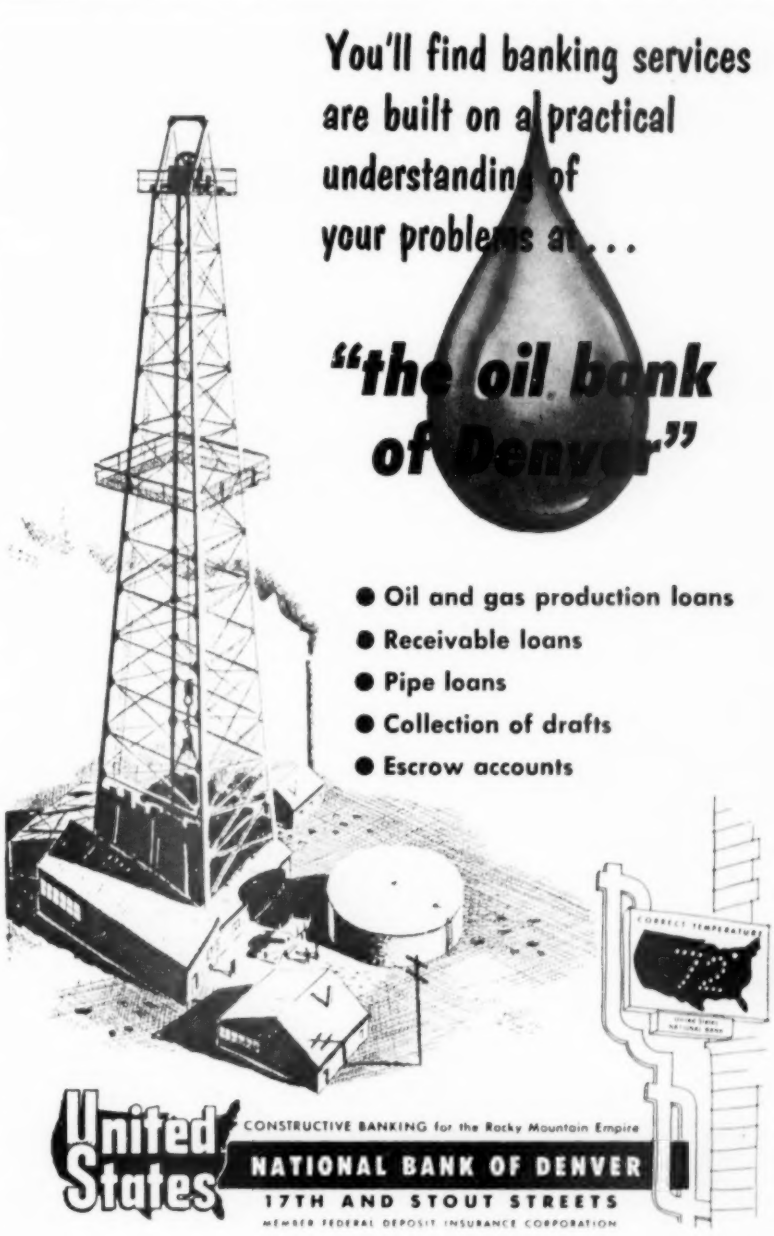
Another horizon showed important oil pays this week at the Don Rayburn 1 Meyers, N½ NE SE 25-20n-3w, Franklin Township, Clare County—this time the Detroit River, so-called "sour zone" section. Previously well showed for possible commercial completion in both the Traverse and Dundee oil pay objectives. Ultimate goal for this outpost test is the Richfield at about 5,500 ft.

A 4-hour drill-stem test was run in this Detroit River horizon at 4,878 ft. after coring for and in this zone was started at about 4,828 ft. Gas showed to the surface in 20 minutes. At the conclusion of the test drill-pipe carried 570 ft. of clean oil, 90 ft. of mud-cut oil and no salt water. If this well produces oil, and there is every indication that it will, it will be a discovery producer in every horizon excepting the one most recently tested. An earlier wildcat, at the south 40-acre offset to the 1 Meyer, which is now abandoned, is credited with being the Detroit River discovery. The entire section from present point to the Richfield total depth will be cored and tests will be run when and if cores indicate possible oil and gas saturation.

Rayburn had rotary rigs drilling on two offset locations to the 1 Meyer this week, and had location staked for another test in the area. Although drilling was started at these other locations partly on the basis of the encouraging results of tests at the 1 Meyer, they were likewise started in part because of expiring primary terms on closein leases. New starts included the 1 Frier, N½ SW SE 25-20n-3w, and the 1 Arbuckle et al, N½ NW SW 30-20n-2w, Sherman Township, Gladwin County. The other location announced was for the 1 Robbins, N½ SE NW 25-20n-3w.

KENTUCKY

On Rockhouse Creek in the Pike County sector of Big Sandy gas field, Kentucky-West Virginia has completed a good gasser at 6104 Bowles & Ratliff. Mississippian Maxon sand was topped at 1,789 ft. and penetrated to a total depth of 1,905 ft. Well was completed naturally from pay sand 1,839 to 1,902


You'll find banking services are built on a practical understanding of your problems at . . .
"the oil bank of Denver"
● Oil and gas production loans
● Receivable loans
● Pipe loans
● Collection of drafts
● Escrow accounts
United States
CONSTRUCTIVE BANKING for the Rocky Mountain Empire
NATIONAL BANK OF DENVER
17TH AND STOUT STREETS
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

ft. for an official open flow potential of 1,400,000 cu. ft. of gas daily.

Also in Pike County but located on Marrowbone Creek, Kentucky-West Virginia have an oil well at their 6081 Harrison Ratliff. Well made 15 bbl. oil daily from Maxon sand topped at 2,448 ft. and bottomed at 2,510 ft. Well was shot at 2,368 ft. and 2,422 ft.

APPALACHIAN AREA

OHIO

Belden Oil and Gas Co. are running three strings at West Sparta with some success. Their 1 S. O. Bowman, Section 25, Pike Township, Stark County, was completed natural, pumping 25 bbl. per day. Production is from the lower part of the Clinton at 4,945-4,959 ft.

C. A. Davis et al completed a nice well on Chas. Reed, Section 12, Butler Township, Knox County. Second Clinton at 3,071-3,086 ft. made 2,100,000 cu. ft. natural.

Mid East Oil Co. 1 Guy Hammer, Section 33, Madison Township, Perry County, found no oil, but 150,000 cu. ft. gas natural in Clinton at 3,270-3,326 ft. The sand was fractured and the volume increased to 600,000 cu. ft.

WEST VIRGINIA

In Union district, Monongalia County, West Virginia, Hope Natural Gas Co. 9745 Rosa B. Wolfe, deep wildcat, elevation 1,648 ft., which reached a salt bed at 8,380 ft., had 30 ft. of this formation. After a break of 17 ft., it was again encountered at 8,427 ft., and is now drilling at 8,471 ft. A small show of gas had been encountered at 7,358 ft. in the chert. Moorfield district, Hardy County, United Fuel Gas Co. 8011 T. H. & E. Dabisson ran the 7-in. casing at 6,951 ft., and is shut down after cementing. The Oriskany sand was reached at 6,947 ft. Davis district, Tucker County, Blaho Oil & Gas Co. 1 Willie J. Trout, is drilling at 4,056 ft., and in St. George district, Natural Resources Corp. 1-2 Tucker County Court is at 3,601 ft.

MERCOID

MERCURY SWITCH EQUIPPED

AUTOMATIC CONTROLS

FOR OUTDOOR, INDOOR OR EXPLOSIVE ATMOSPHERES

APPLICATION: Mercoid Controls are adaptable to a wide range of applications involving the control of pressure, temperature, liquid level or mechanical movement.

ELECTRICAL CONTACT: Mercoid Controls incorporate sealed mercury switches which are impervious to dust, dirt and corrosion. These switches can give a million operations without deterioration.

CIRCUIT ARRANGEMENTS: There are any number of special circuits available to meet your particular problem.

OPERATING RANGES—SENSITIVITY: Mercoid Controls are available in many ranges with the sensitivity your application requires.

CONSTRUCTION: Standard type instruments are furnished with steel case. Special cases and housings are available for protection against weather, excess vapors, splashing or explosive atmospheres.

Write for Catalog No. 7008

PRESSURE

DIFFERENTIAL PRESSURE

LIQUID LEVEL

TEMPERATURE

For Protection Against Explosive Atmospheres, Weather, Vapors

THE MERCOID CORPORATION

4209 BELMONT AVENUE · CHICAGO 41, ILLINOIS

New York: 203 E. 42nd St. · Philadelphia: 3137 N. Broad St.

CANADA

Half Dozen New Strikes Added to Year's Total

Six new oil and gas discoveries were added to the western Canada total during the past week, as a half dozen exploratory ventures being drilled within the borders of Alberta were chalked up as discoveries. The new finds during the past week include three oil and three gas strikes.

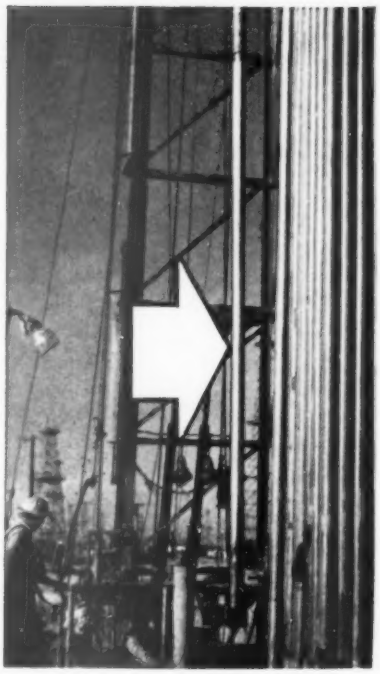
The oil discoveries, all of which at this date appear to be of commercial worth, were made at wells in the Armelgra, Buck Creek and Sturgeon Lake areas of southern, central and northern Alberta. Two of the new gas discoveries were made in the southern portion of the province, in the Atlee and Munson sectors, while the other is located in the central sector, near the town of Dyberg.

Armelgra . . . This week's discovery at Armelgra came at a well that had previously been chalked up as a gas strike in a high formation. That well, Northern-Union 4-9 Crown, on LSD 4, 9-13-13w4, 40 miles west of Medicine Hat found 25 ft. of oil pay sand in the Ellis sand formation. Crew has penetrated the oil discovery horizon and is now coring in the Madison formation. This well which also found gas in Bow Island formation is being drilled by Northern Development Oil Co. on a farmout from Union Oil of California.

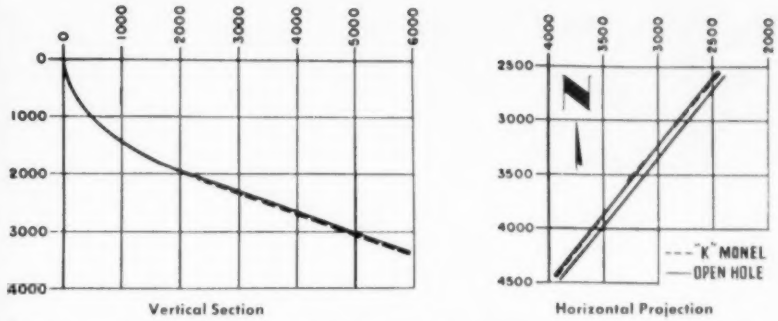
Buck Creek . . . The Buck Creek discovery came in the Belly River sand at a wildcat being drilled on a joint basis by Imperial Oil, Ltd., and Canadian Superior of California. This new indicated oil success, Imperial-Canadian Superior 14-29 Buck Creek, on LSD 14, 29-48-6w5, 56 miles southwest of Edmonton, gave up a pipe recovery of 930 ft. of gassy oil and 120 ft. of oil mud emulsion during a 1 hour test of the interval 3,580 to 3,605 ft. Two subsequent tests lower in the formation failed to show further oil encouragement and the well is now heading down to its lower objectives.

Sturgeon area . . . The final new oil strike this week was reported by Amerada Petroleum Corp. at an exploratory test in the Sturgeon Lake D3 oil producing area. This well, Amerada Crown "Z" F 22-16, on LSD 11, 16-71-23w5, about 70 miles south of Peace River town, recovered 80 bbl. of clean crude oil during drill-stem test in the D3 formation. The well is located 2¾ miles south-southeast of Amerada's first oil find at Sturgeon Lake. The D3 contact at this well is some 41 ft. lower than at the first discovery, where about 90 ft. of oil column was found.

Atlee area . . . The southern Alberta gas discovery was drilled by a group headed by High Crest Oils, Ltd., on Home Oil, Ltd., farmout lands in the Atlee area, 40 miles north-northwest of Medicine Hat. This well is



Set-up of string in the Wilmington, California field. The Servco 20' "K" Monel Collar is as strong as any steel drill section, takes drilling stresses equally well. No special fittings or handling.



How Open-Hole and "K" Monel Collar Surveys Compare – Surveys by both methods were checked in a rapidly built up high angle hole. Notice how closely they agree.

Hit your Underground Targets Right on the Nose!

You can control vertical and directional drilling accurately, today . . . and at a cost so low that it no longer pays to risk missing underground targets.

You do it like this: Use a drill collar made of permanently non-magnetic "K"® Monel. It receives the survey instrument and holds it in exact position for accurate recording. It isolates the instrument from magnetic effects of the string which might cause error. It keeps its non-magnetic qualities even with extensive cold-working. You will get an accuracy that matches open-hole surveys but costs far less . . . because you don't have to round-trip pipe every time you make a survey.

While going remains easy, you will probably want to make several surveys on a wire line through the drill pipe during each bit run. When hard formation is reached, and bit runs become shorter, you can "go-devil" the instrument at the end of each run and retrieve it when the drill string is pulled.

To get a complete survey, "go-devil" a multi-shot instrument the same way. Then take all the pictures you want on the way up. Regardless of angle, the "K" Monel Collar keeps the instrument aligned and prevents "droop" error.

Isn't that easy . . . and inexpensive? Not an extra round trip! No pulling of center bits! No lost instruments or snagged wire to retrieve. Often, in fact, you can get your records while retrieving a core barrel or performing some other chore.

When it comes to positioning deflecting tools, use a "K" Monel Orientation Sub in the drill string. It will help insure the same accuracy and protection during your survey.

The Servco Corporation can supply you with over 35 different types of drill collars and orientation subs in popular sizes and fitted with conventional tool joints. Servco is located at 904 Security Building, Long Beach 2, Calif.

To handle other tough oil field problems, calling for special metals like "K" Monel, come to Inco. One of the many Inco Nickel Alloys is likely to provide just what you need.

THE INTERNATIONAL NICKEL CO., INC.
67 Wall Street New York 5, N. Y.

Inco Nickel Alloys

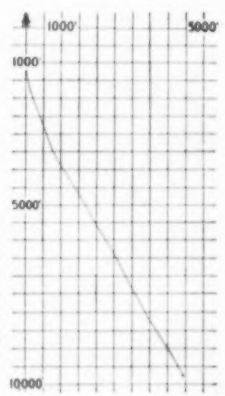
MONEL® • "R"® MONEL • "K" MONEL
"KR"® MONEL • "S"® MONEL
INCONEL® • INCONEL "X"®
INCONEL "W"® • INCOLOY® • NICKEL
NIMONIC® Alloys • DURANICKEL®
LOW CARBON NICKEL

Why Survey Drill Collars are made of "K" Monel

1. **"K" Monel is permanently non-magnetic** down to −100°C. Its maximum permeability of 1.02 is only slightly greater than air at 1.00. It will not become magnetic through cold-working in the well or as a result of high well temperatures.

2. **"K" Monel compares favorably with steel.** "K" Monel Collars don't wear quite so well as steel collars but they are tougher and stronger. Yield strength, 120,000 psi; tensile strength, 153,000 psi; elongation, 23%; Brinnell hardness, 278.

3. **"K" Monel resists corrosion.** In marine locations and in sour wells, "K" Monel gives outstanding performance . . . often outlasts other materials by years.

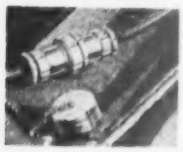


Survey of an Offshore Directionally Drilled Well

Max. angle, 36° 30'; total deflection, 4,433 ft.; total measured depth, 10,900 ft.; true vertical depth, 9,748 ft.; drill collar "K" Monel.

CANNON PLUGS

chosen for quality in geophysical explorations...



W Series...rugged heavy duty watertight

well logging...

K Series...for sensitive instrumentation

pumping engines...

GB Series...for pumping engine starting

Cannon Plugs are important components affecting the portability, flexibility, and better maintenance of oilfield electrical and electronic equipment.

In geophysical exploration, well logging operations, Cannon's Series P, X, XL, K, AN, DP and W plugs are widely used. For power supply, engine starting and high current applications, the rugged GB Series provides a wide variety of services. The petroleum industry has found that Cannon Plugs increase operational efficiency wherever they're used. For an easy-to-understand summary of the vast Cannon line, send for the Cannon Plug Guide, or AN, K, GB Bulletins.

CANNON ELECTRIC

Since 1915

CANNON ELECTRIC COMPANY, LOS ANGELES 31, CALIFORNIA
Factories in Los Angeles, Toronto, New Haven. Representatives in principal cities. Address inquiries to Cannon Electric Company, Dept. K-164, Los Angeles 31, California.

scheduled for completion in the Jefferson formation and is now heading down towards that objective. The gas discovery at this well, High Crest-Canoil 1 Atlee Trust, on LSD 3, 34-21-7w4, was chalked up in the Bow Island and Sunburst sand formations. The larger of the two gas flows was recorded in the Sunburst when drill-stem test of interval 3,181 to 3,200 ft., flowed gas at a maximum daily rate of 7,260,000 cu. ft. A test higher up in the Bow Island zone, of interval 2,593 ft. to 2,661 ft. gave up gas at 1,915,000 cu. ft. daily.

Munson area . . . In the Munson area, about 2½ miles east of the Drumheller (West) oil producing area Canadian Gulf Oil Co. discovered a large flow of natural gas in the glauconitic sector of the Cretaceous at its 5-9 Munson venture, on LSD 5, 9-30-20w4. That well is reported to have flowed natural gas at 17,000,000 cu. ft. daily during test of interval 4,409 to 4,436 ft. Crew is now drilling below 5,152 ft. heading on in search of its main objective, the D3 zone of Devonian.

Dyberg area . . . This week's gas discovery in the Dyberg area, some 12 miles southeast of Wetaskiwin was made at a well that had previously been chalked up as a dual zone gas discovery, and now rates as a triple zone gasser. This test, Texaco-Cal-Standard 1 Dyberg, on LSD 8, 15-44-23w4, found gas in the Ellerslie section of the basal quartz during the past 7 days, adding to the value of its earlier discoveries in the Belly River and Viking sand formations. The Cretaceous find was made during drill-stem test of interval 4,711 ft. to 4,719 ft. Natural gas flowed to surface 15 seconds after packer was opened and reached a maximum flow rate of 4,640,000 cu. ft. daily during the 60-minute test. Pipe recovery on the single test showed 3 ft. of heavy crude oil. Crew was drilling below 6,028 ft. at last report, also heading down to the Devonian formation.

EASTERN CANADA

Ontario . . . An exploratory test started 4 months ago by a Toronto company near Hickson, in Perth Province, had reached 3,800 ft. with a small gas production but no oil. In recent weeks the drill has been working in a hard formation resembling granite. A second test will be drilled in the Monkton area as part of an extensive deep drilling exploratory project.

Gaspe . . . In the Gaspe peninsula, Quebec Province, The 2 Bald Mountain has sidetracked lost tools and is making new hole below 5,972 ft. On the Galt Brook Dome, Continental 1 deep test has recovered lost sand pump and is cleaning out shot hole preparatory to deepening from 3,226 ft. The 1 Asphalt Base is in hard lime below 1,936 ft. with oil still coming from the upper formations. The 1 Tar Point, shut down waiting for control equipment, is making gas from 7,069 ft.

ILLINOIS

W. C. McBride, Inc. 1 John T. Jacobs et al, SE SW NW 24-5s-8e, 6 miles southwest of Carmi in White County, is waiting on cable tools for completion after recovering 715 ft. of clean oil, 10 ft. of mud-cut oil, with 1,100 psi. bottom hole pressure on a 1-hour drill-stem test in the Aux Vases lime at 3,122-35 ft.

Casing has been set at 1 Irvin Allen, SW SE SW 8-1s-9e, Wayne County, by Slagter Producing Co. A test will be made in the Rosiclare lime at 3,303-16 ft. A 1-hour drill-stem test gassed in 8 minutes and recovered 840 ft. of clean oil, 100 ft. of oil-cut mud and 40 ft. salt water. BHP was 1,200 psi. This wildcat is 5 miles south of Mr. Erie and 1½ miles from nearest production.

CALIFORNIA

New Discovery Looms In Rosedale Area

C. W. Teater 1 Teater-Billington appeared it would result in a new field discovery, producing from the Lerdo sand of upper Miocene age. The wildcat, about 2½ miles east of Rosedale production and approximately the same distance southeast of Rosedale Ranch field, was expected to be completed on the pump.

Located in NE SW 19-29s-27e, the potential discovery yielded 1,400 ft. of clean oil following a formation test at 4,290-4,347 ft. A string of 7-in. casing then was set at 4,290 ft. and perforated 5½-in. liner run to the plugged-back depth of 4,345 ft. The name Greenacres has been requested as the field name if the discovery proves commercial.

Solano County Gas Discovery

A new gas field, possibly to be designated Liberty Cut, was added about 3 miles south of Maine Prairie gas field in Solano County, Sacramento Valley, Arcady Oil Co. 1 Fahn, in SW NW 9-5n-3e, was completed flowing 2,000 M.c.f. of gas through a 10/64-in. choke. Production was through perforations at 4,128-38 ft., with hole bottomed at 5,000 ft.

Paloma Test Still Fishing

Ohio Oil Co. was continuing fishing operations in its Paloma field test, which is the world's depth record holder at 21,482 ft. Drill pipe was stuck early in November while attempting to pull a core from that depth. Pipe was recovered from above 10,889 ft. and since then wash-over operations have been under way. About 1,200 ft. of pipe had been freed by this activity.

OKLAHOMA

North Jarvis Pool Well Put on Production

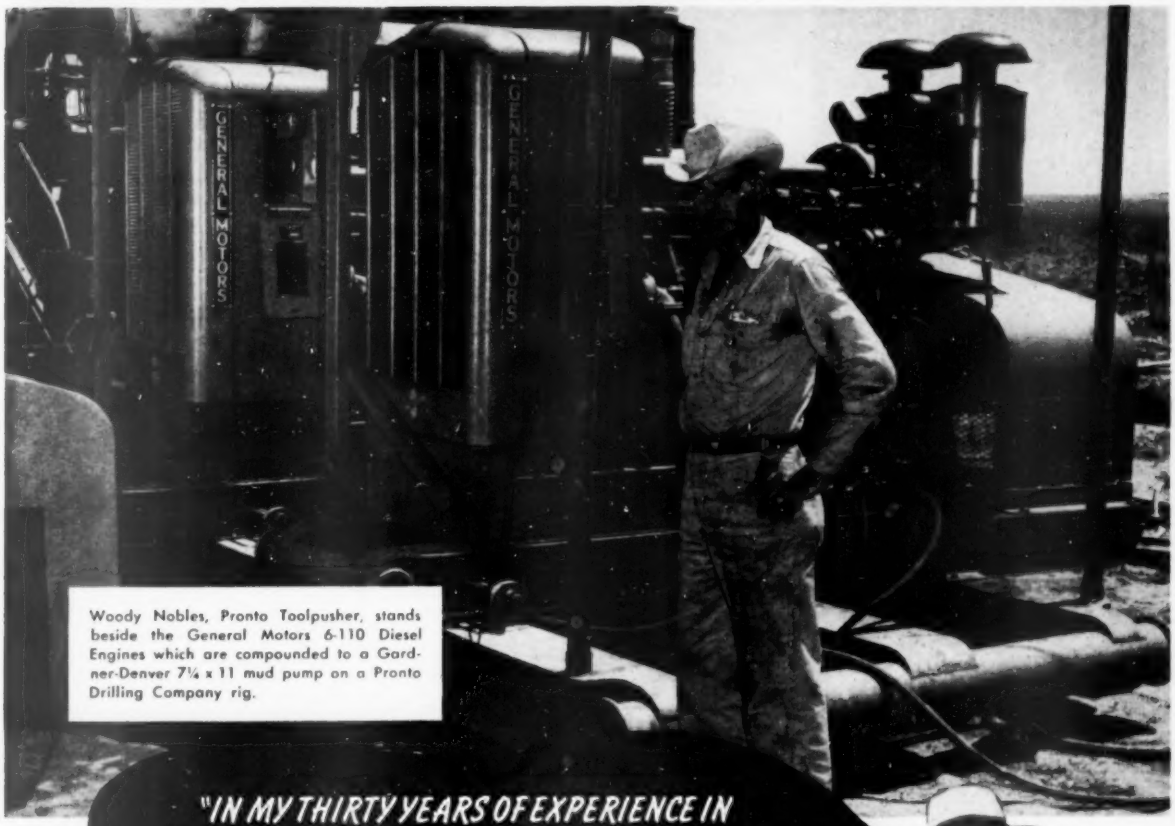
Union Oil Co. of California and Sun Oil Co. 1 Dickey, SE SE NE 29-29n-6w, second well in new North Jarvis Simpson pool in Grant County, is being put on production after flowing an average 8 bbl. of oil per hour cutting 5 per cent water on ½-in. choke.

The operator will move the rig to another well, the 1 Conrady, NW NW SW 28. The discovery well of the new pool, the 1 Simpson, NE NE SE 29, was finaled in September for a flow of 310 bbl. of oil per day from the Simpson sand at 5,256-76 ft. to become one of the year's most important strikes in Oklahoma.

McClain Discovery Has High Hourly Flow

In the Freeny district of McClain County Kenneth A. Ellison et al 1 Community-Featherstone, C NW SE 35-8n-4w, flowed

HERE'S ANOTHER REASON WHY STEWART & STEVENSON IS THE NATION'S LARGEST DISTRIBUTOR OF GM DIESEL ENGINES



Woody Nobles, Pronto Toolpusher, stands beside the General Motors 6-110 Diesel Engines which are compounded to a Gardner-Denver 7¼ x 11 mud pump on a Pronto Drilling Company rig.

"IN MY THIRTY YEARS OF EXPERIENCE IN THE OILFIELD, I HAVE NEVER SEEN SERVICE AS GOOD AS THAT OF STEWART & STEVENSON" – *LEE MINTON, PRONTO DRILLING COMPANY*

Nearly three years ago, Pronto Drilling Company powered this Emsco GA-250 with General Motors Diesel Engines from Stewart & Stevenson, including the auxiliary pumps and light plants. During the life of the rig, it has drilled an unusual number of wells (more than 250,000 feet) with a minimum of down-time. Lee Minton gives much of the credit for his low down-time record to the excellent service from Stewart & Stevenson branches.

Service to the customer is the rule we live by at Stewart & Stevenson Services . . . because we feel that engines are only as good as the parts and service organization behind them. Good service is just one reason why Stewart & Stevenson is the Nation's largest distributor of GM Diesel Engines. Here is another: Stewart & Stevenson has the greatest backlog of experience in engineering more different types of diesel and gas engine applications than any other engine distributor. When you need any kind of oilfield power, call Stewart & Stevenson. There's a branch less than two hours from your operations.

STEWART & STEVENSON SERVICES, Inc.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas. Phone WOodcrest 9691

Branches: Corpus Christi, Dallas, Lubbock, Wichita Falls, McAllen (San Juan), Odessa.

Representatives: San Antonio, Longview, Brownsville.

Distributors of: General Motors Diesel Engines, Climax Blue Streak Engines, Chrysler Industrial and Marine Engines, Chicago Pneumatic Engines, Potter Diesel Engines.

Fabricators of: Electric Power Units, Electrical Control Equipment, Portable Pumping Units, Truck Bodies, Red Head Pumps.

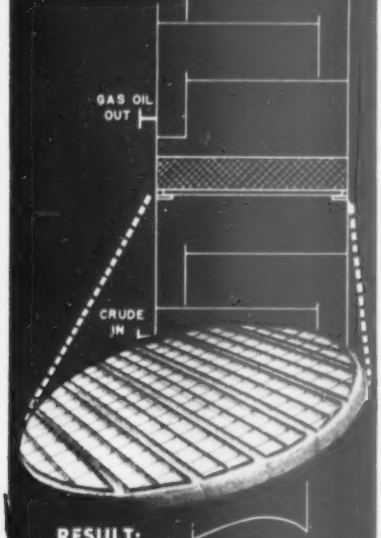
PARTS... SERVICE

STEWART & STEVENSON SERVICES, Inc.

Anytime Anywhere

THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES

This YORKMESH DEMISTER means Clean Separation in a Vacuum Tower



RESULT:
Cleaner gas oil with reduction in carbon and metals contamination which means increased yield of higher octane gasoline from your cat cracker.

For installation in—
LUBE VACUUM TOWERS
DISTILLATION EQUIPMENT
GAS ABSORBERS
SCRUBBERS
SEPARATORS
EVAPORATORS
KNOCK-OUT DRUMS
etc.

Send today for Catalog 13

OTTO H. YORK Co., Inc.
77 Glenwood Place, E. Orange, N. J.

an average 51 bbl. of oil per hour on ½-in. tubing choke.

The deep discovery well is flowing 48°-gravity oil and 2,000 M.c.f. of gas per day from perforations at 10,550-580 ft.

Creek County Discovery Has Good Initial Flow

Joan Production Co. of St. Louis has an excellent discovery well in Creek County 5.2 miles east and 1 mile south of Bristow in the NW SE SE 1-15n-9e.

The 1 Jesse Allen has been completed for an initial flow of 45 bbl. of oil per hour after fracturing. Through ⅞-in. choke the strike flowed 23 bbl. per hour, and is now flowing 210 bbl. of oil per day on ⅛-in. choke. Gravity of the oil is 31°. Production is from perforations at 2,838-46 ft. with total depth 2,895 ft. The Dutcher sand discovery also had Prue, lower Skinner, and Bartlesville sand shows.

The second well in the new pool will be completed in the Bartlesville. It is the north offset, the 1 Lizzie Allen, SW SE NE 1-15n-9e. A Prue test will be drilled at 2 Jesse Allen in the NE SE SE, an east offset. It was spudded November 24.

KANSAS

Oil Shows Logged at Rank Harper Wildcat

Beardmore Drilling Co. et al have logged oil shows and gas shows at a rank Harper County wildcat, the 1 Olivier, NE NE NW 2-32s-6w, about 18 miles southeast of Grabs pool and 4 miles east of Harper.

A Mississippian drill-stem test at 4,280-90 ft. recovered 55 ft. gas-cut mud, 120 ft. oil-cut mud, 30 ft. oil-cut water and 30 ft. water.

Testing Under Way at Sheridan County Test

Sauvage & Dunn have an indicated pool discovery well 1 mile north of Wessel pool in Sheridan County at the extreme north end of the Central Kansas uplift.

The operators are testing and acidizing at 1 Brantley, SE SE SE 16-6s-29w. Two bbl. of oil per hour were swabbed from the Lansing perforated at 4,081-85 ft.

Big Pratt County Well Flows From Viola Lime

Rine Drilling Co. reports a flow of 528 bbl. of oil in 14 hours at 1 Gereke, NW NE SE 12-26s-15w, 4 miles west of Moore Southwest pool in Pratt County.

The operator is setting tanks and shutting in the strike. Crews perforated Viola at 4,389-97 ft. and swabbed 7 bbl. of oil per hour. After acidization the well started flowing from perforations at 4,376-86 ft.

Operators Final Tests

Nine discoveries in Kansas have been completed recently. In Barton County Murfin Drilling Co. has finaled 1 Byers, SE SE NW 33-18s-13w, for a pump potential of 479 bbl. of oil per day from the Arbuckle. In Edwards County Branine and Holl completed 1 Skalsky, CS½ SE NE 22-24s-16w, for a pump potential of 109 bbl. of oil per day from the Kansas City lime. Also in Edwards County Natural Gas and Oil Co. completed 1 Enlow in the SE NE NW 9-24s-16w, for 379 bbl. of oil per day from the Lansing. United Producing Co. has a discovery at 1 Salmon in the C SE NW 29-29s-27w, Gray County, finaled for 10 bbl. of Morrow oil per day. In Lyon County K&E Drilling Co. 1 Mohr is a Bartlesville strike in the NW SW NW 29-20s-10e.

Natural Gas and Oil Co. 1 Hearn, SE SW NE 35-23s-15w, is a new Pawnee County discovery, finaled for 4,000 M.c.f. of gas per day from the Lansing. Petroleum, Inc. 1 Dick, NE SE NW 29-10s-19w, is a new Arbuckle oil discovery in Rooks County, finaled for 240 bbl. per day. Heathman & Co. 1 Baumgartner "B," CN½ NE NE 20-9s-18w, had an initial of 2,779 bbl. of oil daily from the Arbuckle, also in Rooks. In Stafford NCRA 1 Newell, NW SW NW 7-25s-11w, has a draw-down potential of 3,000 bbl. of oil daily from the Arbuckle.

TEXAS

NORTH TEXAS

Swastika Discovery Showing in Jones County

In Jones County, 2½ miles northwest of Stith, C. U. Bay 1-C Dunagin had oil shows in Swastika sand. A drill-stem test between 2,855-69 ft. had gas in 5 minutes and flowing oil in 1 hour and 15 minutes, at which time the tool was closed.

Second test from 2,869-79 ft., open 35 minutes, had oil in 24 minutes, and at 2,879-91 ft. oil surfaced in 42 minutes. Operators set pipe on bottom at 2,951 ft. for completion attempt.

An Ellenburger prospect in a Canyon producing area was reported at B. A. Duffey and Union Oil Co. of California 2 Evelyn Cox, 12 miles southwest of Sweetwater in Nolan County.

A drill-stem test in the Ellenburger from 6,842-68 ft. had gas in 3 minutes and oil in 36 minutes. It flowed for 20 minutes at the rate of 15 bbl. hourly. Operators were running electrical surveys.

In northeast Nolan County, Honolulu Oil Corp. 2 Whitaker, south offset to its recent southwest extension to Cambrian production in White Flat field, had flowing oil on a drill-stem test in the Cambrian sand from 5,527-65 ft. Gas surfaced in 2 minutes, oil in 7 and the project flowed 106 bbl. of oil to tanks in 1 hour. Choke size was not reported. An additional 9 bbl. of oil was unloaded as pipe was laid down.

In Knox County, Seaboard Oil Co. 2-C Hamilton, 20-13-H&TC, northwest of Knox City, has completed as a Tannehill sand discovery. On potential test it flowed 100 bbl. of 37°-gravity oil daily through 10/64-in. choke from perforations at 2,505-09 ft.

WEST TEXAS

Long Offset is Strawn Confirmation Well

Continental Oil Co. 1-D Harris, semi-wildcat in northwest Crockett County, found sulfur water in the Ellenburger, but plugged back to become the second Strawn well in a new area.

Location of the 1-D Harris is about midway between shallow production in the World field and its 2-C Harris, Strawn discovery finished earlier this year. Operators drilled the 1-D to 8,825 ft. then plugged back to 8,335 ft. The Strawn was perforated at

this Bulletin . . .

GIVES YOU THE "INSIDE STORY" ON THE GREATEST PROGRESS IN SAFETY VALVES FOR OVER 50 YEARS ! ! !

Yes, it's all about the new

Lonergan **UNI-LINE** 41-W-200 Series

No other valve like it

Write, today, for your copy of this new UNI-LINE 41-W-200 Series Bulletin.

Lonergan

J. E. LONERGAN COMPANY

Second and Race Sts., Phila. 6, Pa.

Over 80 years experience

Will not leak at Pressures up to 3,000 lbs.

Every Inferno Gauge Cock is tested to 2,000 lbs. before leaving the factory. Laboratory tests, however, prove that the cock will not leak at pressures up to 3,000 lbs. Seating discs are reversible, double row, so that the surface on both sides may be used. Other interesting details of Inferno Gauge Cocks are explained in Bulletin 18-C. Write for it.

THE INFERNO CO.

Box 1138A
115 RICOU St.
SHREVEPORT, LA.

INFERNO

The Texas Co. 1 Sallie E. Duggan, second test within Littlefield townsite in Lamb County. Location is within the city park and a long southwest offset to 1-98 Union, San Andres discovery. (See Exploration page, this issue.) Hall Stewart Drilling Co., Midland, is owner of the above rig.

intervals between 8,190-8,238 ft., which tested 325.65 bbl. of oil in 12 hours through 20/64-in. choke.

Northeast of Ozona, Continental 31-36 University tested a good volume of gas with a small amount of distillate on a drill-stem test in the Strawn from 7,898-7,945 ft. Gas was gaged at 4,816 M.f.g. daily.

Continental 32-13 University prepared to drill ahead after recovering mud with no shows in the Ellenburger at 9,640-79 ft.

Lea pool outpost . . . C. E. Marsh 1 Lea, northeast of Lea-Ellenburger pool, Crane County, developed 3,733 ft. of 40° oil on a 4-hour drill-stem test in Waddell sand between 7,909-51 ft. Top on the sand was 7,925 ft. This well had the Montoya at 6,870 ft., by samples, minus 4,370 ft., which was about 25 ft. low to the Lea discovery well.

Deep well staked . . . Rowan Drilling Co. had work under way at its 1 Stanton-Brunson, southeast Gaines County wildcat scheduled to 14,000 ft. or to the Ellenburger. Location is in League 308, Terrell CSL, 11 miles southeast of Seminole townsite, and 7 miles northwest of Glasco 1 Butler, new Devonian discovery near the county line in north Andrews County.

TEXAS GULF COAST

Bender Extension Well Finds Three Pay Zones

The rapidly developing Bender producing area in southern Montgomery County is virtually assured of another substantial extension as a result of indicative showings encountered in a wildcat drilled by Mar-Tex Oil & Gas Co. and Devon Leduc Oils, Ltd., southwest of the field.

The wildcat, 1 Harris et al, in the Walker County School Land Survey, showed for production in at least three Yegua zones. The first was the Kuhlman sand, productive in

HOW TO PUMP OIL AT LOWER COST!

Specify DARCOVA

the original composition valve cup

EXCEPTIONAL resistance to wear and deterioration is built into every *Darcova* cup or ring! • The right, scientifically developed and controlled texture gives peak efficiency and longer flex-life at *any* depth! • *Darcovas* are the right size for every make or size pump!

Longer life . . . fewer pulling jobs and perfect fit are good reasons why you should ask for *genuine Darcovas* at your supply store.

DARLING VALVE & MANUFACTURING COMPANY

DARCOVA

WILLIAMSPORT 1, PA.

THE ORIGINAL COMPOSITION CUP

the Kuhlman area to the south on the Montgomery-Harris county line, in which approximately 15 ft. of gas-distillate pay was logged at 5,800 ft. The next was the EY-2 zone at 5,960 ft. with 12 ft. of gas-distillate pay indicated. The third was the Bender sand, main oil-producing horizon of the Bender field, which was topped at 6,067 ft. and penetrated 13 ft.

Oil-string has been run through all zones to total depth at 6,079 ft. for completion of the well.

Bender field was opened early last May by Sinclair Oil & Gas Co.

TEXAS GULF COAST

Madison County Wildcat Indicates Buda Discovery

Indications of commercial production in Buda lime have been given in a deep wildcat test being drilled by J. B. Stoddard, of Dallas, in the J. Bozeman Survey, 8 miles northeast of Madisonville, in Madison County.

Top of the Buda lime (upper Cretaceous) was logged at approximately 9,360 ft. Hole was carried to 9,417 ft. in the prospective pay, where a drill-stem test was run, recovering more than 6,900 ft. of clean oil. The test, taking in the section below 9,378 ft., was through ¼-in. and 3.8-in. chokes. There was a steady blow of gas throughout the test, and when the well was shut in, bottom-hole pressure gaged 2,960 psi.

Hole is being deepened to the Georgetown lime, its original objective.

Location is approximately 4 miles west of Fort Trinidad field, on the Madison-Houston county line, where not only the Buda lime, but also the Georgetown lime and the Woodbine-Dexter formations are productive. The test is listed as 1 Tinkle.

SOUTHWEST TEXAS

Jim Wells County Gets New Oil-Discovery Well

Inca Drilling Co. has an oil-discovery well at its 1 Miller, located in the San Antonio de Agua Dulce Survey, 2 miles south of Orange Grove and north of Reynolds field, in northeastern Jim Wells County.

Flowing through 10/64-in. choke, the well produced 100 bbl. of 30.3°-gravity oil in 24 hours under 410-psi. pressure with gas-oil ratio of 260 cu. ft. per barrel. Producing interval is 4,787-91 ft. Hole had been drilled to 5,885 ft.

The discovery has been designated tentatively as North Reynolds field.

New Starr County Field Gets Extension Producer

Production in the new Strong area, 1 mile west of Sun field, 17 miles north of Rio Grande City, in Starr County, has received a substantial southwesterly extension with completion by Heep Oil Corp. of its 1 Saenz, flowing 149 bbl. of 42°-gravity oil per day through 10/64-in. choke from the field's basal Frio pay sand, perforated at 4,657-61 ft.

Strong field, opened last August by Paul C. Strong and Corpus Christi Refining Co., has been the scene of active development since then, and now has seven producing wells, three completed by Corpus Christi Refining Co., three by Humble Oil & Refining Co., and the new extension well by Heep.

LOUISIANA

SOUTH LOUISIANA

Cote Blanche Field Gets 15,250-Ft. Oil Producer

Cote Blanche Island, in St. Mary Parish, has been added to the list of Coastal Louisiana fields with production below 15,000 ft. The new deep production has been opened by The Texas Co. at its 22 State Lease 340-Cote Blanche Island, which flowed 522 bbl. of 31.3°-gravity oil daily from Miocene sand, open through casing perforations at 15,243-56 ft. Flowing pressure gaged 2,100 psi. Gas-oil ratio was 460 cu. ft. per barrel.

From a still deeper sand, perforated at 15,790-810 ft., the well, in previous tests, flowed 84 bbl. of 42.4°-gravity distillate and 8,156,000 cu. ft. of gas daily through 12/64-in. choke.

The field has a well, completed by The Texas Co. in 1951, which produces from a sand interval at 14,387-426 ft., which until now has been the deepest production in the field.

Cote Blanche is less than 10 miles southeast of Weeks Island, in Iberia Parish, which has the world's deepest production at depths below 17,000 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: Don H. Parker et al 1 Davies, L. Rivas Sur. 63, A-1054. IPP 95 BOPD, open hole 4,969-5,010 ft. TD 5,010 ft. (New field.)

Tri-Mark Oil Co. and Texita Oil Co. 1 Williams, John K. Lyle Sur. 229, A-541. Dry. TD 2,573 ft.

Bastrop County: F. C. Cooper and Roy Shinault 1 Yarrington-Cooper, J. M. Bangs Sur. Dry. TD 704 ft.

Duval County: Jake J. Hamon 2 Allen, Jim Lawson Sur. 216, A-1853. Dry. TD 2,750 ft.

The Texas Co. 1-A DCRC NCT 19, GC&SF Sur. 299, A-1088. Dry. TD 3,939 ft.

Frio County: George Parker 1 Gracey et al, Leonor Menchacha Sur., A-498. Dry. TD 3,600 ft.

Gonzales County: James Doughty 1 Hassman, Ezekiel Williams Sur., A-81. Dry. TD 1,581 ft.

J. E. Mowinckle 2 Lamkin, A. W. McCamley Sur., A-344. Dry. TD 4,527 ft.

M. G. Perry 1 Towns, John Oliver Lge., A-52. Dry. TD 5,720 ft.

Plymouth Oil Co. 1 McMillan, A. Dillard, A-193. Dry. TD 2,208 ft.

Jim Hogg County: Miller & Pierce 1 Rivera heirs unit, Edds Homestead Tract, Noriecitas Grant. Dry. TD 4,224 ft.

Jim Wells County: Inca Drilling Co. 1 Miller, Sec. 14, Reese & Dunn Subd., San Antonio de Agua Dulce Grant, A-249. IP 100 BOPD, 10/64-in., 30.3°, casing perforations 4,787-4,791 ft. TD 5,885 ft. (New field—North Reynolds.)

La Gloria Corp. 31 Blucher, Mrs. L. Best Sur., A-362. IP 140.84 BOPD, 8/64-in., 35°, casing perforations 6,809-24 ft. TD 8,010 ft. (New pay in Tijerina-Canales-Blucher field.)

Skelly Oil Co. and Pacific Western Oil Co. 1 Freeborn, Garrett M. Ridgeway Sur., A-404. Dry. TD 5,265 ft.

Medina County: Carter & Carter 3 Bendele, F. Sauer Sur. 117, A-919. Dry. TD 190 ft.

San Patricio County: Pan American Production Co. 2 Brown, M.P.J. and N. Delgado Grant, A-4. Dry. TD 5,699 ft.

Renwar Oil Corp. 2 Maryland, Lot 3, F. R. Peters Subd. IP 148.28 BOPD, ⅛-in., 43°, casing perforations 6,750-53 ft. TD 7,147 ft. (Extends Puerto Bay field.)

Stanolind Oil & Gas Co. 1 McCampbell, Enos Cooper Sur., A-195. IP 165.47 BOPD, 10/64-in., 41.8°, casing perforations 7,786-90 ft. TD 11,336 ft. (New field.)

TEXAS GULF COAST

Bee County: Grey Wolf Drilling Co. 1 Seger, George O'Docharty Sur., A-49. Dry. TD 4,517 ft.

Brazoria County: Eddy Refining Co. 1 Hawley, Louisiana Morton Sur., A-101. Dry. TD 11,002 ft.

Rowan Oil Co. 1 Garrett et al, Francis Moore Sur., A-100. Dry. TD 12,112 ft.

DeWitt County: J. R. Butler 1 Dahse, Stephen Prather Sur., A-385. Dry. TD 8,639 ft.

Francis J. Hynes 1 Egg, John F. Pettus Sur. IP 1,150 M.c.f. daily, open flow, Wilcox Massive 8,097-8,108 ft. (casing perforations). TD 8,307 ft.

Fayette County: Sutton Drilling Co. 2-B Gabitsch, J. T. Whitesides Lge., A-107. Dry. TD 1,181 ft.

Galveston County: James H. Snowden et al 1 Cohen, Lot 468, C. C. Washington Sur. on Galveston Island. Dry. TD 7,518 ft.

Harris County: Barousse & Barrett 1 Addicks et al, A. Addix Sur., A-1441. Dry. TD 6,000 ft.

J. M. Huber Corp. and Columbian Fuel Co. 1 Keng, Section 25, WCRR Sur., A-918. IP 155.43 BOPD, 3/16-in., 38°, Yegua 6,701-03 ft. (casing perforations). TD 7,613 ft.

W. B. Trammell 1 Amos Mahaffey est., Elizabeth Smith Sur., A-70. Dry. TD 7,008 ft.

Jackson County: Alcoa Mining Co. and Crown Central Petroleum Co. 1 Appling, Block 37, Section 21, Koch Subd., Samuel C. Lyons Sur., A-212. IP 18,000 M.c.f., open flow, casing perforations 8,498-8,508 ft. TD 9,872 ft. (New field—Appling).

D. M. Wallace 1 Drushell, Lot 3, Holzheuser Subd., Pedro Gallardo Sur., A-23. Dry. TD 5,000 ft.

Liberty County: B. B. M. Drilling Co. 1 Davis et al, Manuel de los Santos Coy Four League Grant, A-16. Dry. TD 2,005 ft.

General Crude Oil Co. 2 Langham et al, David Cole Sur., A-161. Dry. TD 9,000 ft.

Tyler County: Humble Oil & Refining Co. 1 Hooks et al, M. Sharp Sur., A-177. Dry. TD 9,989 ft.

Wharton County: Johnson & Appling 1 Lindbloom, Lyman Conkrite Sur., A-16. Dry. TD 5,815 ft.

EAST TEXAS

Anderson County: Fort Bend Oil Co. 2 Exie Cummins Williams, Thomas Kinley Sur., A-450. Dry. TD 5,940 ft.

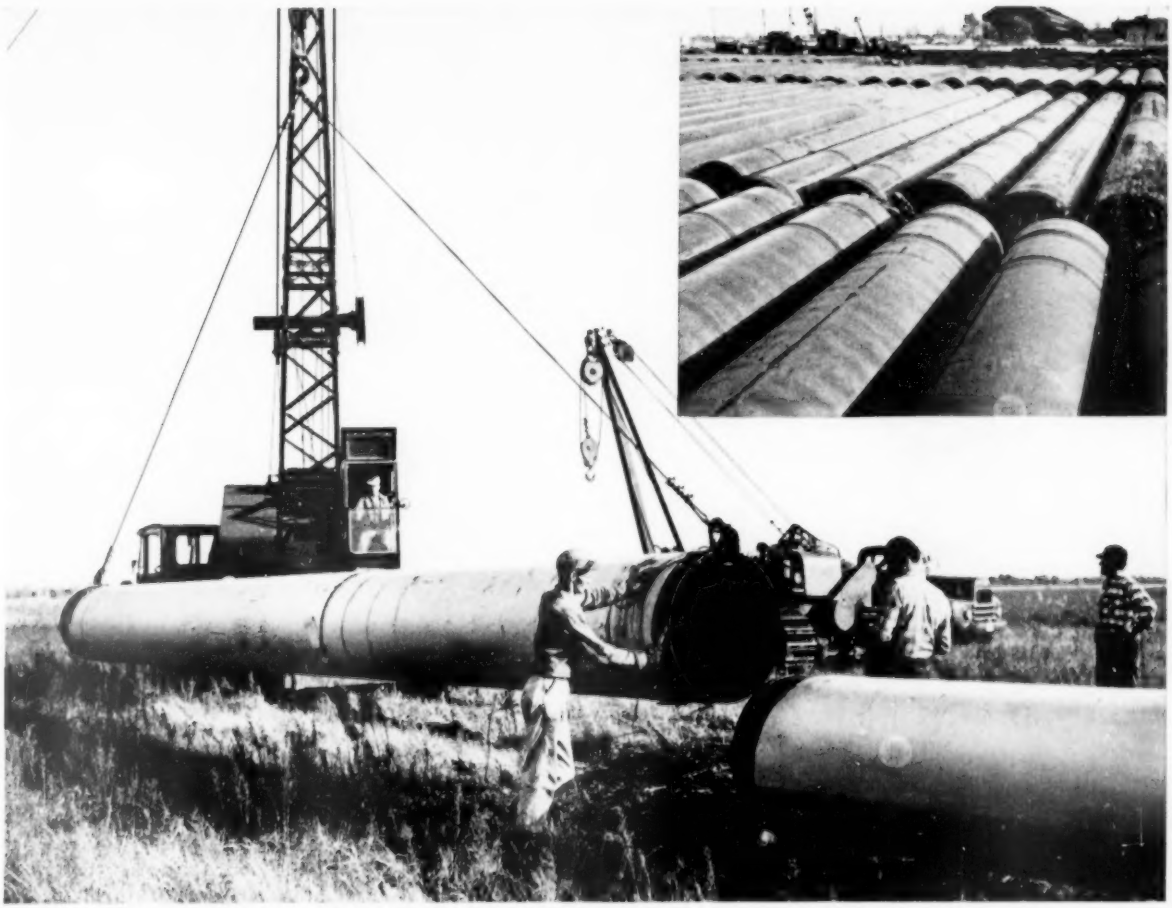
Cass County: Henry A. King 1 Tunstall, BBB&C Sur. 139. Dry. TD 4,507 ft.

Cherokee County: F. R. Jackson 1 Wiley Black, P. E. Bean Sur., A-4. Dry. TD 5,719 ft.

Harrison County: Hollandsworth Oil Co. et al 1 Leo Butler, James Holbert Sur. Dry. TD 7,340 ft.

Shelby County: Isbrandsten Oil Co. of Louisiana 1 Stephens, Stephen English Sur. Dry. TD 4,220 ft.

Wood County: R. E. Smith 1 Tarver, S. E. Gray Sur., A-251. Dry. TD 7,180 ft.



This 40-ft length of Bethlehem Oil and Gas Pipe is moved into position on gas line for Northern Indiana Public Service Co. Inset shows the stockpile of Bethlehem Pipe ready to be trucked to the trench.

Steel Pipe Is Strong, Sound, Economical

Bethlehem Oil and Gas Pipe is ideal for distribution lines because it's carefully made to give years and years of trouble-free service. Made to meet widely varying requirements and specifications, our pipe is thoroughly tested and inspected for strength and high quality.

Bethlehem is equipped to handle virtually every phase of pipe-making—grit-blasting, priming, enameling and wrapping, and the manufacture of tees, crosses, and other types of fittings. Diameters range from 22 in. i.d. up to the largest permitted by common carriers.

Here's the answer to Severe Vibration

Pipe made of Bethlehem's Mayari R is the ideal solution whenever unusual vibration and pulsation is a problem. Mayari R is our low-alloy, high-strength steel. Its mechanical properties are considerably higher than those of carbon steel. It has a yield point of 50,000 psi minimum. In addition, Mayari R is highly resistant to impact and atmospheric corrosion.

A letter or phone call to the nearest Bethlehem sales office will bring you complete information about the advantages of Bethlehem Oil and Gas Pipe.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM OIL AND GAS PIPE

BETHLEHEM STEEL

Another of 15 reasons why

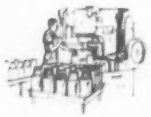
Advanced design. The list of **REED** tool joint developments is assurance that **REED** Tool Joints contain all the latest improvements in design.

Chemical analysis of every heat of steel is checked by spectrograph.

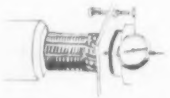
Strength and toughness of every heat of steel are determined by three different testing machines.

Grain structure and grain flow are checked by microscope. **REED** Tool Joints meet the very highest standards.

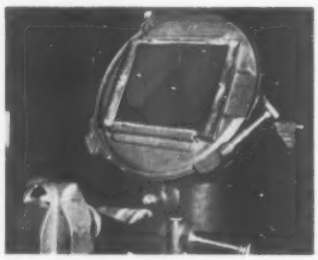
Hardenability tests are made and form the basis for the "tailored" heat treatment of tool joints made from different heats of steel.



Precision machining is accomplished by specially designed automatic machines.



Jigs and fixtures of the highest precision assure perfect alignment and concentricity of **REED** Tool Joints.



Thread comparator checks hob used to cut **REED** Tool Joint threads, assuring accuracy of thread form, lead and taper.

Automatic heat treating furnaces—especially designed for the job—heat tool joints to utmost precision in a carefully controlled atmosphere.

This central control room enables the heat treat foreman to "tailor" the treatment of each heat of steel to extreme accuracy.

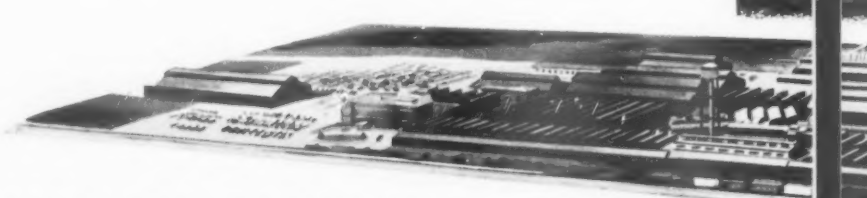
Precision quenching and drawing complete the "tailored" heat treatment that gives the best combination of strength and toughness to every tool joint.

Hardness testing is final assurance that every **REED** Tool Joint is strong and tough.

Tool joint threads are treated to prevent galling during breaking-in. Complex metal phosphate coating acts as a pre-lubricant infused into the threads.

"Reedite" hard facing—available on order—is factory applied to resist abrasion better and make tool joints last longer.

These hand gauges, plus comparators, master gauges, profilimeters, magnaflux and other machines, are used to make the 120 inspections each tool joint must pass.



REED ROLLER BIT COMPANY HOUSTON 1, TEXAS

NEW YORK • LONDON • BUENOS AIRES

REED tool joints last longer!

INSPECTION

Of the 120 separate inspections that **REED** Tool Joints must pass before being approved by the final inspector, none is more important than the Magnaflux.

In this inspection, the tool joint is magnetized and covered with a fluid containing iron powder.

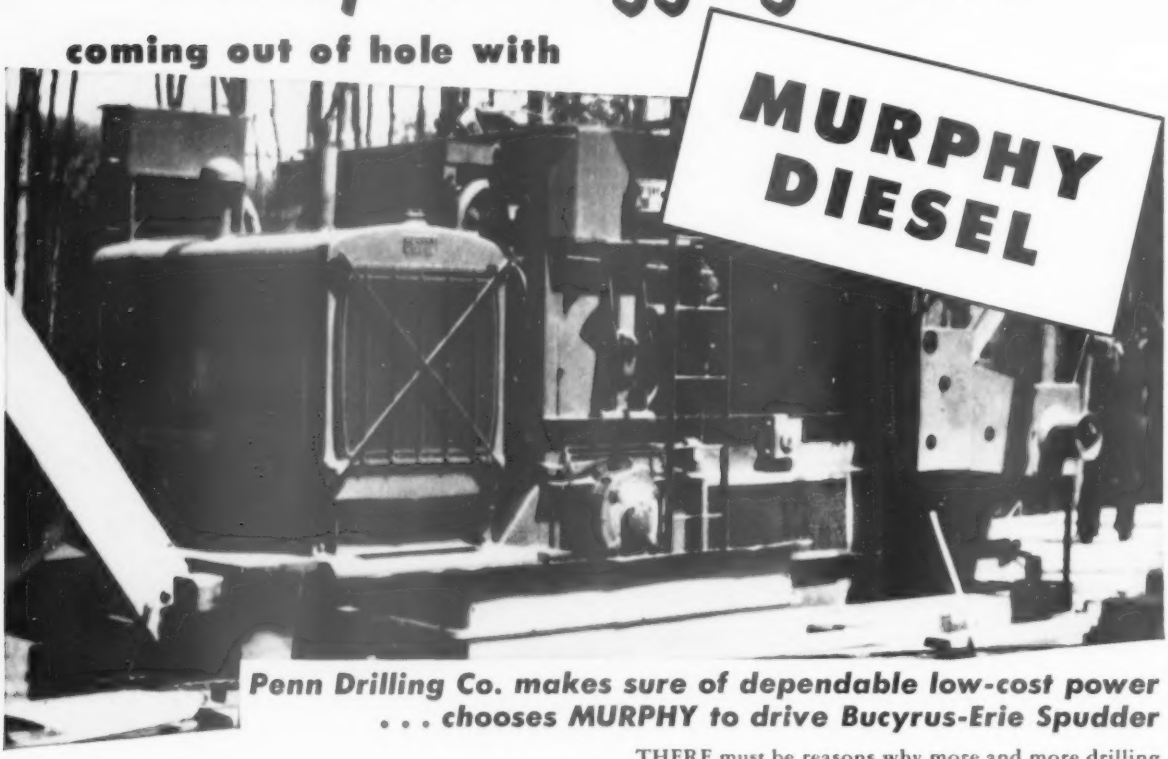
The powder adheres to the tool joint and reveals cracks and subsurface flaws that cannot be detected by normal inspection procedures.

Since most failures start as invisible cracks, this inspection is an important aid in preventing early failures of tool joints. It is another important reason why **REED** Tool Joints last longer.

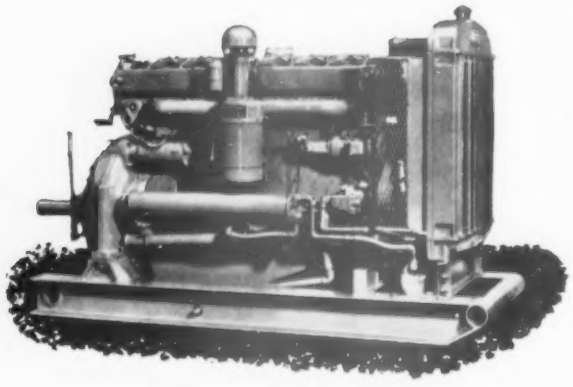
A212

Plenty of Lugging Power

coming out of hole with



Penn Drilling Co. makes sure of dependable low-cost power . . . chooses MURPHY to drive Bucyrus-Erie Spudder



Murphy Diesel engines and power units are made in sizes from 90 to 260 H.P.; dual-fuel engines, 135 to 215 H.P.; generator sets from 60 to 140 K.W.

THERE must be reasons why more and more drilling contractors pick Murphy for power in the oil field. Here are some of them. *Quick starting*: A Murphy kicks off fast and easy . . . even in subzero temperatures. This is assured by precise fuel control by the Murphy Unit Injector and "true" diesel principle. *Good, reliable lugging power* results from high torque that rises fast as engine speed is dragged down. This is the kind of torque you can get with Murphy Diesel. *Low operating costs*: less fuel is burned because of the Murphy Unit Injector system and "true" diesel efficiency. Minimum maintenance and longer life result from distortionless pistons, four valves per cylinder, hydraulic-servo type governor and many other advanced design features. Add them up. You'll find that Murphy gives you more heavy duty power at lower cost than any other engine of comparable size. To get a more detailed picture ask your Murphy dealer for a copy of "10 Reasons Why Your Next Engine Should Be a Murphy" or write direct today.

MURPHY DIESEL COMPANY
5305 W. Burnham St., Milwaukee 14, Wisconsin
FACTORY BRANCH: Sales, Parts and Service—113-116 S. Elwood St. Tulsa, Oklahoma

280

MURPHY DIESEL

SEE YOUR MURPHY DIESEL DEALER, TODAY—

Albuquerque, New Mexico
Lively Equipment Company
Butte, Montana
Hall-Perry Machinery Co.
Corpus Christi, Texas
Houston Engine & Pump Company
Dallas, Texas
Conley-Lott-Nichols Machinery Co.
Denver, Colorado
Constructors Equipment Company
Edmonton, Alberta, Canada
Northern Engine & Equipment Co., Ltd.
San Antonio, Texas
J. E. Ingram Equipment Co.
Great Bend, Kansas
Manufacturers Dist. Co.
Great Falls, Montana
Hall-Perry Machinery Company
Houston, Texas
Houston Engine & Pump Co., Inc.
Jackson, Michigan
Utility & Industrial Supply Co.
Los Angeles, California
Industrial Engine Service
Lubbock, Texas
Conley-Lott-Nichols Machinery Co.
Glenn Rose Engine Service
502 South Real Road
Bakersfield, California

SALES, PARTS AND SERVICE, 113-117 S. ELWOOD STREET, TULSA, OKLAHOMA

WILDCAT COMPLETIONS

WEST CENTRAL TEXAS

Callahan County: Johnson & Warren 1 Mrs. Elmer Jackson, 96-12-T&P. Dry. TD 1,201 ft.

Schkade Bros. Drilling Co. 1-A Buna Vista Hooker, 91-13-T&P. Dry. TD 1,792 ft.

Coleman County: G. B. Cree 1-D Morris, Sec. 72, C. M. Mann Sur. Dry. TD 2,815 ft.

C. T. Hedges 1 Ashmore, M. Martinez Sur. 751. Dry. TD 2,815 ft.

M. C. M. Oil Co. 1 Smith-Bowers, 12-2-GH&H. Dry. TD 3,511 ft.

Ted Weiner 1 John C. Lauder, Sec. 481, Lewis Johnson Sur. Dry. TD 2,007 ft.

Fisher County: W. E. Butler 1 Robert S. Scott, T. Ayers Sur. Dry. TD 6,015 ft.

Fisher County: Robert M. Bass 1 Huddleston, 78-1-H&TC. Dry. TD 5,101 ft. Elev. 1,991 ft., reef 5,083 ft.

Gore Drilling Co. 1 Douglas, 24-1-H&TB. Dry. TD 6,252 ft. Elev. 2,023 ft., Ellenburger 6,100 ft.

Trans-Tex Drilling Co. 1 M. T. York, 190-1-BBB&C. IPP 201 BOPD, 39°, pay 4,481 ft. TD 5,399 ft.

Haskell County: Anderson & Word and W. F. Newton 1 Hendrick, Sec. 1, AB&M Sur. IP 116 BOPD, 14/64-in., 43°, lower Strawn 4,422 ft. TD 4,475 ft.

Mid-Continent Petroleum Corp. 1 Brown, Sec. 3, WCRR Sur. Dry. TD 5,979 ft.

Robinson-Puckett, Inc. 1 Elmer Wedeking, Sec. 50, G. Harris Sur. Dry. TD 5,200 ft.

Jones County: Lester & Duffield & Billups 1 Gentry, 72-1-BBB&C. Dry. TD 3,169 ft.

Rock Hill Oil Co. 1 Rice, 14-1-T&NO. Dry. TD 2,845 ft.

Ungren & Frazier 1 Breland, Sec. 98, BBB&C Sur. Dry. TD 2,577 ft.

United North & South Development Co. 1 Ernest Jackson, 2-5-H&TC. Dry. TD 5,023 ft.

Nolan County: General Crude Oil Co. 2 Urcy Mae Ussery, 310-64-H&TC. Dry. TD 5,320 ft. Elev. 2,500 ft., Canyon 5,273 ft.

Thos. D. Humphrey & Sons 1 Linn Smith, 285-64-H&TC. Dry. TD 6,508 ft.

Stonewall County: Allen Guiberson and J. D. Tompkins 1 Mrs. Ella Bunnell, Sec. 1, T. Constable Sur. Dry. TD 6,092 ft. Caddo 5,868 ft., Mississippian 6,082 ft.

Throckmorton County: Great Expectations Oil Corp. 1 Wolfe, TE&L Sur. 694. Dry. TD 4,984 ft.

C. N. Valerius 1-H Travis CSL, Travis CSL Sur., Blk. 44. Dry. TD 5,400 ft.

NORTH TEXAS

Archer County: L. T. and Bobby Burns 1 Meade Estate, Blk. 40, G. P. Meade Subd. Dry. TD 5,328 ft.

E. B. Clark and Reno Oil Co. 1 Miller, Lot 15, Blk. 20, J. B. Miller Subd. Dry. TD 4,459 ft.

Luke Grace Drilling Co. 1 Frank Jehlik, Blk. 132, J. W. Harris Subd., Club Ranch. IPP 49 BOPD, 42°, pay 3,703-10 ft. TD 3,749 ft.

W. F. Holmes 2 Baggett, C. W. Dugan Sur., A-1059. Dry. TD 1,334 ft.

W. F. Holmes 1-D Petrex Oil Corp., Blk. 108, ATNCL Sur. Dry. TD 1,490 ft.

Clay County: L. T. Burns 1 Turner, TE&L Sur. 3250, A-611. Dry. TD 4,640 ft.

Cooke County: Leland Fikes 1 Bell, H. Bray Sur., A-105. Dry. TD 4,910 ft.

Grayson County: Howell, Holloway & Howell 1 Rue, Asa Hartsfield Sur., A-491, IPP 80 BOPD, 36°, pay 4,468-72 ft. TD 4,510 ft.

Jack County: Lone Star Producing Co. 2-A Cherryhomes, F. M. Clifton Sur., A-229. IP 25 bbl. distillate, 3,310 M.f.g., pay 5,134-51 ft. TD 5,741 ft.

Lone Star Producing 1 Lela Hill Yates, S. D. Smith Sur., A-1424, IP 24 BOPD, 3,780 M.f.g., pay 5,418 ft. TD 5,730 ft.

Russell Maguire 11-A Campsey, A. McNear Sur., A-2086. Dry. TD 5,525 ft.

Perkins & Cullum 1 Rogers, Sec. 1, Wm. McDonal Sur., A-378. Dry. TD 5,200 ft.

Knox County: Did Katz Exploration Co. 1 Mamie McFaddin Ward, 197-44-H&TC. Dry. TD 6,304 ft.

Wichita County: Frank Wood Associated-A. Obenhaus, Blk. 323, Waggoner Colony Subd. Dry. TD 2,107 ft.

Wilbarger County: Frank Wood 1 W. T. Waggoner "victory," Sec. 40, MEP&P Sur. Dry. TD 2,503 ft.

Young County: L. T. Burns 2 Crain, TE&L Sur. 169, A-416. Dry. TD 5,003 ft.

A. R. Dillard 1-B Frank Loftin, Sylphia Tynes Sur., A-274. Dry. TD 3,725 ft.

Grace & Ford Drilling Co. 1 Tackett, R. F. Mitchell Sur., A-2244. Dry. TD 4,232 ft.

Ted A. Norwood 1 Davidson et al, Blk. 78, P. L. Gibson Sur., A-2203. IP 183 BOPD, ¼-in., conglomerate pay 4,196 ftt. TD 4,234 ft.

WEST TEXAS

Andrews County: Anderson-Prichard Oil Corp. 1-I University, 7-7-University Lands Sur. IP 703 BOPD, ¼-in., 47°, Ellenburger pay 13,475 ft. Elev. 2,980 ft., TD 13,487 ft. New pay in Devonian area.

Borden County: Texas Crude Co. et al 1-42 White, 42-33-T4N-T&P. Dry. TD 9,160 ft. Elev. 2,828 ft., Dean sand 8,080 ft.

Coke County: W. M. and A. P. Fuller 1 Johnson, 67-2-H&TC. IP 247 BOPD, 14/64-in., 42°, Strawn sand 6,652-70 ft. TD 6,825 ft. Jameson extension, 1½ miles SW.

Crockett County: J. W. Hampton 1 Myrtle Mitchell, 109-1-I&GN. Dry. TD 2,502 ft.

Harry J. Russell 1-A Baggett, 16-OP-GC&SF. Dry. TD 1,347 ft.

W. E. Tone 1 Bean, 47-UV-GC&SF. Dry. TD 1,398 ft.

Dawson County: Chambers & Kennedy 1 Cox, 19-34-T5N-T&P. Dry. TD 4,844 ft.

Ector County: Blackwood & Nichols Co. 1-5 Neathey 5-41-T&P. Dry. TD 13,695 ft. Elev. 2,964 ft., Strawn 10,340 ft., Devonian 12,024 ft., Ellenburger 13,570 ft.

Gaines County: Phillips Petroleum Co. 1 Hunt-Jackson, 8-313-Gaines CSL. IPP 88 BOPD, 34°, pay 9,462 ft. TD 9,753 ft.

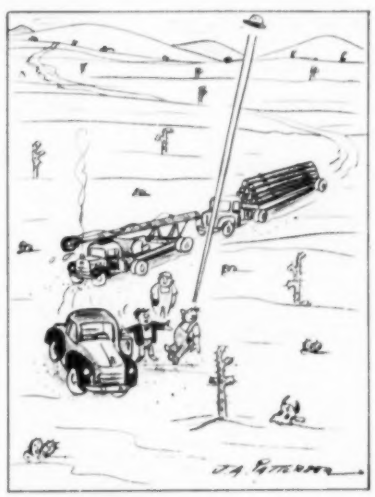
Mitchell County: E. G. Rodman 1 Powell, 38-29-T1S-I&P. Dry. TD 3,503 ft.

Runnels County: J. W. King Jr. 1 Early, Columbus TAT Sur. 65. Dry. TD 2,614 ft.

Mid-West Oil Corp. 1 Wade, Blk. 24, N. Travis Sur. 533. Dry. TD 4,311 ft.

Karl Hoblitzelle and W. E. Lee 1 Moreland, M. H. Brian Sur. 272. Dry. TD 5,138 ft. Elev. 1,785 ft., Ellenburger 5,130 ft.

Sterling County: A. G. Hill 1 Ruth Allen, 8-15-H&TC. Dry. TD 1,795 ft.



"Oh, to blazes with it—This looks like as good a spot as any!"

SOUTHEAST NEW MEXICO

Eddy County: Claude E. Aikmar 1 Stanolind-State, 36-19s-30e. IPP 81 BOPD, 22°, pay 2,047 ft. TD 2,055 ft.

Standard Oil Co. of Texas 1 Cass Ranch Unit, 3-20s-24e. Dry. TD 9,950 ft. Elev. 3,764 ft., Canyon 7,470 ft., Devonian 9,895 ft.

Lea County: Brown & Wheeler 1 Speed, 14-12s-32e. Dry. TD 8,670 ft. Elev. 4,348 ft., Wolfcamp 8,414 ft.

MICHIGAN

Allegan County: Food Oil Co. 1 Neiman, NE NE 32-1n-15w. Dry. TD 1,207 ft. in Traverse lime.

Newaygo County: J. J. Patton, Trustee 1 Kilts, NE NE NW 10-11n-13w. Dry. TD 2,345 ft. in Traverse lime.

Washtenaw County: Sun Oil Co. 1 Horning, SW NE NE 1-3s-3e. Dry. TD 3,241 ft. in Niagaran and Clinton formations.

OHIO

Stark County: Natural Gas W. Va. 1 E. C. Unkefer, Sec. 34, Washington Twp. Dry. TD 5,448 ft. in Clinton.

FLORIDA

Franklin County: A. R. Temple 1 Lister, C NE SE 14-7s-5w. Junked hole 120 ft.

ALABAMA

Escambia County: Stanolind Oil & Gas Co. 1 Strength, 10-1n-8e. Dry. TD 6,298 ft. Elev. 248 ft., Wilcox 1,595 ft., marine Tuscaloosa 5,850 ft., lower Tuscaloosa 6,087 ft., Massive 6,248 ft.

Sunnyland Contracting Co. 1 Merriweather, 35-2n-6e. Dry. TD 6,611 ft. Elev. 271 ft., Wilcox 1,660 ft., Eutaw 5,130 ft., lower Tuscaloosa 6,052 ft., Massive 6,192 ft., lower Cretaceous 6,434 ft.

Marengo County: W. A. Moncrief, Jr., 1 Bradford, C SE SE 17-17s-5e. Dry. TD 2,675 ft. Elev. 292 ft., marine Tuscaloosa 1,980 ft., lower Cretaceous 2,100 ft.

MISSISSIPPI

Adams County: John S. Callon and A. Biglane 1 Armstrong-Coffman unit, 22-5n-2w. IP 75 BOPD, 10/64-in., 40°, Wilcox (Blake) 5,906-09 ft. (casing perforations). TD 7,004 ft. Elev. 84 ft., Wilcox 4,645 ft., Blake 5,906 ft., base Baker shale 6,402 ft.

Nichols-Clay and Justiss & Mears 1 Williams, 8-8n-3w. Dry. TD 7,024 ft. Elev. 260 ft., Wilcox 3,942 ft., base Baker shale 5,500 ft.

B. Serio 1-B U.S.A., 6-5n-1w. IPP 100 BOPD, Wilcox 6,302-95 ft. (casing perforations). TD 6,928 ft. Elev. 298 ft., Wilcox 4,587 ft., base Baker shale 6,355 ft.

Forrest County: T. M. Evans 1 Batten et al, 9-4n-12w. Dry. TD 7,802 ft. Elev. 275 ft., Wilcox 2,453 ft., Tuscaloosa 6,527 ft., lower Cretaceous 7,632 ft.

Franklin County: Durbin Bond & Co., Inc., 1 Chambers et al, 9-6n-2e. Dry. TD 6,501

WILDCAT COMPLETIONS

ft. Elev. 343 ft., Wilcox 4,291 ft., base Baker shale 6,090 ft.

Sunnyland Contracting Co. 1 McGehee, C SE NW 48-5n-1e. IP 80 BOPD, 10/64-in., 29.4°, Wilcox 4,574-78 ft. (casing perforations). TD 6,869 ft. Elev. 178 ft., Wilcox 4,574 ft., base Baker shale 6,350 ft.

Jefferson County: R. H. Alagood and Lyle Cashion Co. 1-B Junkin, 9-9n-2w. Dry. TD 6,021 ft. Elev. 78 ft., Wilcox 3,588 ft., base Baker shale 5,425 ft.

Lamar County: Sunray Oil Corp. 1 Creosote, 13-1n-14w. Dry. TD 9,013 ft. Elev. 252 ft., Wilcox 2,798 ft., marine Tuscaloosa 8,100 ft., lower Tuscaloosa 8,488 ft.

Marion County: Sinclair Oil & Gas Co. 1 Turnage, C NW SW 26-3n-13e. Dry. TD 9,932 ft. Elev. 243 ft., Wilcox 3,388 ft., lower Tuscaloosa 9,462 ft., lower Cretaceous 9,910 ft.

Pike County: Sun Oil Co. 1 Boyd, 10-4n-9e. Dry. TD 7,002 ft. (Stratigraphic test.)

Wilkinson County: J. Paul Ratliff, Jr., 1 Perry, 18-4n-1w. Dry. TD 7,202 ft. Elev. 192 ft., Wilcox 4,800 ft., base Baker shale 6,562 ft.

SOUTH LOUISIANA

Acadia Parish: Sun Oil Co. 1 Acadia Parish School Board, 16-9s-2w. IP 56 BCPD and 1,913 M.c.f. daily, ⅛-in., 50.8°, casing perforations 11,532-52 ft. TD 12,500 ft. (New field—Pinebluff.)

Pan American Production Co. 1 Ellison, C SE SE 20-10s-1e. Shut down. TD 11,100 ft.

Union Sulphur & Oil Corp. 1-B Harmon, 69-7s-2e. IP 116 BCPD and 1,656 M.c.f. daily, ¼-in., 46.7°, casing perforations 10,672-99 ft. TD 10,970 ft. (New pay in Church Point field.)

Allen Parish: Shell Oil Co. 1 Moore, 18-5s-3w. Dry. TD 7,897 ft.

Assumption Parish: Cities Service Oil Co. 1 Brownell-Kidd, 13-12s-12e. Dry. TD 13,013 ft.

Lafourche Parish: Humble Oil & Refining Co. 1 Delta, 3-19s-20e. IP 276.30 BOPD and 1,702 M.c.f. daily, ⅛-in., 38.4°, casing perforations 11,845-53 ft. TD 12,283 ft. Extends, and new pay in Bully Camp field.)

Plaquemines Parish: Gulf Refining Co. 1 State-Harvey unit, 28-23s-31e. Dry. TD 9,000 ft.

Terrebonne Parish: Arkansas Fuel Oil Co. and John W. Mecom 1 Southdown Unit 1, 72-17s-16e. Dry. TD 11,801 ft.

NORTH LOUISIANA

Catahoula Parish: Wentworth, Justiss-Mears 1 Risen-Fairbanks, C SE SW SE 22-7n-6e. Dry. TD 5,739 ft.

Concordia Parish: H. L. Hunt and Gulf Refining Co. 23 Fisher Lumber Co. "E," C NW NE 33-7n-8e. Dry. TD 6,502 ft.

ARKANSAS

Miller County: Simmons & Greer 1 Fouke estate, near SEc W½ SW 31-17s-27w. Dry. TD 5,311 ft.

OKLAHOMA

Garvin County: Carter Oil Co. 1 Camden Stone, NW SE 31-2n-3w. Dry. TD 8,577 ft.

McIntosh County: L. B. Jackson 1 Combs-Jennings, SE SW NW 28-12n-18e. Dry. TD 3,638 ft.

Pawnee County: Davon Oil & Gas Co. 1 School Land, SE SW SE 36-21n-5e. IP 285,000 c.f.g., ¼-in., Red Fork sand 3,064-82 ft. TD 3,082 ft.

Payne County: Falcon-Seaboard Drilling Co. 1 Reynolds, SE SE SW 2-19n-6e. IPP 8.4 BOPD, Lake sand 2,890-2,900 ft. TD 2,904 ft.

KANSAS

Edwards County: Natural Gas & Oil Co. 1 Enlow, SE NE NW 9-24s-16w. IP 379 BOPD, ½-in., pay 3,736-43 ft. TD 4,294 ft.

Ellis County: Okmar Oil Co. 1 O'Brien, SW SW SW 2-11s-19w. Dry. TD 3,660 ft.

Gray County: United Production Co. 1 Luce Salmon, SE NW 29-29s-27w. IPP 10 BOPD, pay 5,103-11 ft. TD 6,500 ft.

Norton County: Jones, Shelburne & Farmer 1 Wiley, SW SW SW 19-4s-22w. Dry. TD 3,720 ft.

Pawnee County: M. B. Armer 1 Snyder, SE SE NE 5-20s-19w. Dry. TD 4,643 ft.

Natural Gas & Oil Co. 1 Hearn, SE SW NE 35-23s-15w. IP 4,500 M.f.g., pay 3,833-4,111 ft. TD 4,157 ft.

Pratt County: Herndon Drilling Co. 1 Blair, NW NW SE 3-29s-12w. Dry. TD 4,572 ft.

Reno County: The Texas Co. 1 Huldah Koenig, NE SW SE 32-22s-10w. Dry. TD 3,745 ft.

Rooks County: Northern Pump Co. 1 Jessop, NE NE NE 28-17s-16w. Dry. TD 3,725 ft.

Sedgwick County: Aylward Drilling Co. 1 Becker, NW NW SE 9-27s-4w. Dry. TD 4,196 ft.

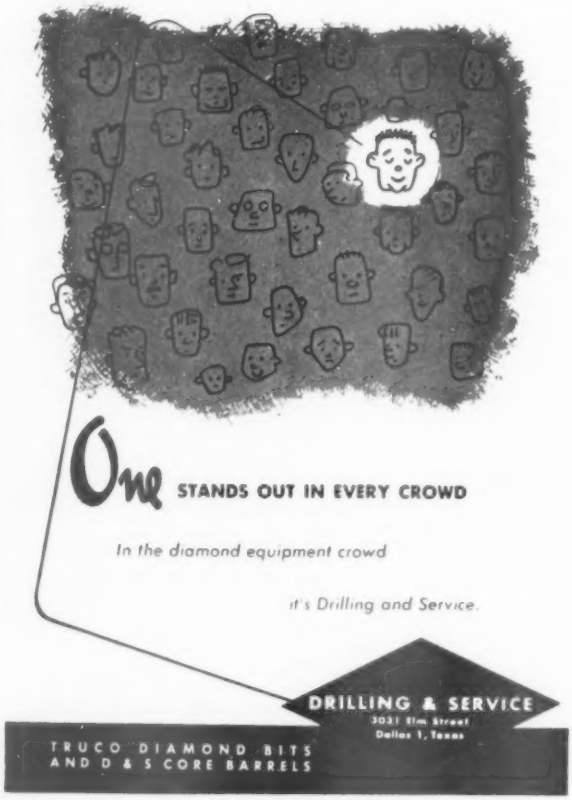
Woodson County: Shira Drilling Co. 1 Keskey, NE NW SE 34-23s-16e. IPP 8 BOPD, pay 1,034-40 ft. TD 1,392 ft.

NEBRASKA

Dawes County: William Clary 1 Christensen, NE NE 4-34n-47w. Dry. TD 2,850 ft.

THE OIL AND GAS JOURNAL

"Certainly we want you to have opinions on the best way to lay this pipe line, Squeemish, but we simply don't want to hear them."


One STANDS OUT IN EVERY CROWD
In the diamond equipment crowd
it's Drilling and Service.
DRILLING & SERVICE
3031 Elm Street
Dallas 1, Texas
TRUCO DIAMOND BITS
AND D & S CORE BARRELS

McPherson County: E. E. Goad 1 Fee, NE NE NE 6-17n-30w. TD 2,224 ft. Shut down.

SOUTH DAKOTA

Perkins County: J. P. Evans 1 J. R. Querges Trust Howard Capp, C NW NW 9-13n-16e. Dry. Granite 7,300 ft. TD 7,318 ft.

NORTH DAKOTA

Mountrail County: OWR Oil & Whitson 1 Nels Johnsberg, SW NW 15-158n-93w. Dry. Mission Canyon 8,348 ft. TD 8,536 ft.

Renville County: Leach & Kelsch 2 R. W. Allen, NE NE NW 17-161n-84w. Dry. TD 325 ft.

Leach & Kelsch 2 Paul Gehringer, SE SE SE 21-161n-84w. Dry. TD 320 ft.

Leach & Kelsch 1 Brudvik, NW SW 21-161n-84w. IP 70,000 CFGPD. Gas discovery—new field. TD 320 ft.

Williams County: White Eagle 1 John Cavanaugh, C NW SE 27-159n-95w. Dry. Mission Canyon 8,112 ft. TD 8,195 ft.

CALIFORNIA

Kern County: C. H. Bent 1 D. B., 7-25s-18e. Dry. TD 1,512 ft.

L. L. Hillman 1 Hillman-Roos, 11-29s-28e. Dry. TD 1,280 ft.

F. A. McDonald 1 Mabury-Still, 11-26s-17e. Dry. TD 2,935 ft.

Pacific Oil & Gas Development Co. 2 Quinn, 14-25s-27e. Dry. Pyramid Hills 1,870 ft., granite 2,265 ft., TD 2,286 ft.

Los Angeles County: The Texas Co. 1 Eadie, 23-3n-16w. Dry. TD 8,011 ft.

Union Oil Co. 3-74 Horse Meadows, 3-2n-16w. Dry. TD 4,624 ft.

Merced County: Richfield Oil Corp. 1 Parker, 10-6s-13e. Dry. TD 3,689 ft.

Monterey County: Humble Oil & Refining Co. 1-C Capital Co., 27-18s-6e. Dry. TD 6,103 ft.

Standard Oil Co. of California 62-29 Rist, 29-19s-10e. Dry. TD 2,434 ft.

Sacramento County: Union Oil Co. 1 Union-Dow, 13-7n-5e. Dry. TD 5,157 ft.

San Luis Obispo County: C. W. Colgrove 53-4 Sawyer, 4-10n-26w. Dry. TD 1,395 ft.

Tulare County: Kern Oil Co., Ltd. 14 Lubking, 27-24s-27e. Dry. TD 2,638 ft.

Ventura County: H. C. Long, Opr. 1 Shiells, 32-4n-19w. Dry. TD 3,076 ft.

The Texas Co. 2 Hunter, 6-3n-18w. Dry. TD 9,971 ft.

SASKATCHEWAN

Canada Southern 7-12 Dewar, LSD 7, 12-31-26w3. Viking oil well. TD 2,558 ft.

Socony-Ohio 1 Holdfast, LSD 9, 11-23-26w2. Dry. TD 2,995 ft.

Tide Water 1 Lawrence Lake Crown, LSD 1, 25-8-20w3. Dry. TD 4,790 ft.

Amurex-Canada Southern 2-2 Moser, LSD 2, 17-14-26w3. Dry. TD 3,158 ft.

Killgore-Leytze Palmer Oil 16-35, LSD 16, 35-5-11w2. Mississippian Canyon oil well. TD 5,245 ft.

Socony-Woodley-Southern 2-4A SE Midway, LSD SE¼ 4, 2-14-19w3. Upper Shaunavon oil well. TD 3,772 ft.

Potash Co. of America 7 Saskatoon, LSD 4, 22-36-2w3. Dry. TD 3,538 ft.

Shell 15 Wood Mountain, LSD 4, 11-8-10w3. Dry. TD 4,853 ft.

ALBERTA

New Continental 1 Ponder Fort Saskatchewan, LSD 6, 15-53-22w4. Dry. TD 4,875 ft.

Mill City 1 Bonnyville, LSD 11, 16-59-4w4. Blairmore gas well. TD 1,483 ft.

WILDCAT COMPLETIONS

Imperial 10-36 Girouxville, LSD 10, 36-79-23w5. Dry. TD 4,288 ft.

Okalta Keho Lake, LSD 5, 8-11-22w4. Dry. TD 6,890 ft.

BRITISH COLUMBIA

Dome et al Stanolind 1 Buckinghorse, 12 miles east of Mile Post 180-Alaska Highday. Dry. TD 10,949 ft.

Pacific-Atlantic 2 Pingel Creek, LSD 5, 26-81-18w6. Triassic gas well. TD 8,071 ft.

MONTANA

Chouteau County, Goosebill area: Continental Oil Co. 1 Lennington, SW NW NW 24-27n-7e. Dry. Madison 2,735 ft. TD 2,788 ft.

T. F. Hodge & Associates 1 Bartlett, NE NE 33-27n-7e. Dry. Madison 2,724 ft. TD 2,750 ft.

Fallon County, Little Beaver: Shell Oil Co. 33-3, NE NW SE 3-4n-61e. Dry. Ordovician 8,150 ft. TD 8,648 ft.

Glacier County: Amy Oil Co. 1 Douglas, NW NW SW 17-36n-12w. Dry. TD 1,800 ft.

Musselshell County, Absher: Flank Oil 1 Cartwright, C SW NW 22-9n-30e. Dry. Mission Canyon 7,453. ft. TD 7,669 ft.

Roosevelt County, Elmdale: Delhi-Greer 1 Danielson, C NE NW 5-27n-51e. Dry. Mission Canyon 5,980 ft. TD 6,514 ft.

Rosebud County, Cohagen "B": F. R. Anderson 1 Government, C NW NE 2-12n-40e. Dry. Winnipeg 8,691 ft. TD 8,701 ft.

WYOMING

Big Horn County, Bonanza: Signal Uintah Basin Oil and Justheim 2 Government,

"an outstanding contribution to the art of oil property valuation" —

OIL PROPERTY VALUATION

by PAUL PAINE, a consulting engineer with many years' experience in the oil production business

— because it covers such subjects as:

Oil properties and oil property interests . . . with definitions, examples, lists of required data, and a useful table giving the products of customary fractions used in dividing oil-property interests.

Unproved lands . . . including measures of value, the lease, selection rights, royalty, etc.

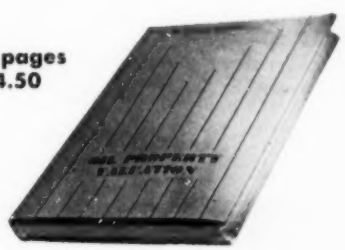
Oil and gas reserves . . . with definitions of terms, descriptions of methods . . . and all the working details.

Elements in valuation . . . including marketing; the gas; costs for acquisition, development, operations, taxes and overhead; and many other topics.

Valuation methods . . . explains the classic "engineering method" in detail with excellent examples of data compilations; describes other methods based on the time to pay out, the average daily barrels of oil production, the well itself, and the barrels in the ground; remarks on valuation compiled for the lender of money, on royalties, and on fair market value.

The examination and report . . . gives practical directions on how to go about a job, the examination of accounts, and the preparation of a report.

204 pages
$4.50

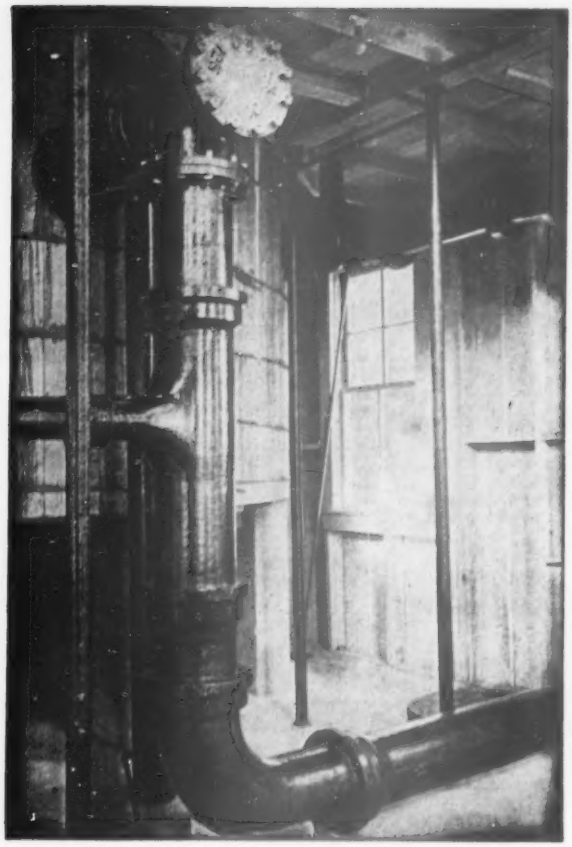


For sale by

READER SERVICE DEPARTMENT

THE OIL AND GAS JOURNAL

BOX 1260 • TULSA, OKLA.



DIRECT ROUTE TO LOWER PLANT MAINTENANCE

The direct and indirect expense of replacements of short-lived refinery pipe lines can be reduced, or avoided altogether, by the use of cast iron pipe. This has been proved by many refineries whose maintenance costs have been lowered by replacing other pipe materials with cast iron.

A relatively low first-cost material, cast iron pipe is usually cheapest in the end, for many refinery applications, because of its stubborn resistance to corrosion. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints.

Cast Iron Pipe Research Association,
Thomas F. Wolfe, Engineer,
1015 Peoples Gas Bldg., Chicago 3, Illinois.

CAST IRON PIPE
FOR LONG LIFE AND ECONOMY

POSITIVE Service
with Thompson Unitized Vacuum Tanks

Jim Ogden and M. C. Chancellor of Chancellor & Ogden, Inc., vacuum tank service company of Long Beach, are two pioneers in California, Texas and Oklahoma oil industry operations. Read what they say:

"WE'RE POSITIVE that your problems of moving liquids and semi-solids will disappear when you put a Thompson Unitized Vacuum Tank on the job.

"WE'RE POSITIVE that you can count on Thompson Unitized Vacuum Tanks for dependable service every time, any place.

"WE'RE POSITIVE that our fleet of Thompson Unitized Vacuum Tanks is saving important time and money for refiners, drillers, producers, and pipeliners.

"Continued customer satisfaction is proof."

If you have a liquid or semi-solid moving problem you'll want to know the whole story. Thompson UVT are made in 20-100 bbl. capacity; truck, trailer, semi or skid-mounted; priced about what you'd expect to pay for a good car. New complete Unitized Vacuum Tank Trailer will be ready soon. Watch for the announcement.

SOLE LICENSEE TO MANUFACTURE VACUUM TANKS UNDER U. S. PAT. NO. 2522077

THOMPSON
Tank & Manufacturing Co., Inc.
2019 East Wardlow Road, Long Beach 7, California

In South America—International Gas Lift, S.A.
Caracas, Venezuela

WILDCAT COMPLETIONS

NE SE SW 15-49n-91w. Dry. Tensleep 3,250 ft. TD 3,404 ft.

UTAH

San Juan County, Gross Canyon area: L. M. Glasco et al 1 Government, NE SE NW 35-38s-25e. Dry. TD Salt 5,624 ft. TD 6,206 ft.

Uintah County, Section Ridge: Utah Southern 2 Government, NE NE NE 31-5s-24e. Dry. TD 265 ft.

COLORADO

Adams County: New Drilling Co. 1 Haack, NE NE NW 4-2s-57w. Dry. "J" sand 5,686 ft. TD 5,865 ft.

Archuleta County: J. R. Butler et al 5 Crowley, NW NE SW 17-32n-2e. Dry. TD 1,595 ft.

La Plata County, Bayfield: Mac T. Anderson 1 Carson, C NW SW 36-35n-8w. Dry. TD 2,458 ft.

Logan County: South Texas Development 1 State, C SW NE 5-7n-53w. Dry. "J" sand 4,820. TD 4,977 ft.

Shell Oil Co. 1 Budin, C SW SE 2-8n-55w. IPF 243 BOPD, through 20/64-in. choke. "J" sand discovery—new field. "J" sand 5,248. TD 5,406 ft. PB 5,290 ft.

Moffat County, Axial basin: Charles M. Jameson 1 J. S. Warner, Lot 19, Sec. 36-6n-96w. Dry. Morrison 940. TD 2,005 ft.

Sugar Loaf: Mountain Fuel Supply 1 Unit, SE SW NE 9-11n-101w. "Mesaverde discovery—new field." Baxter 7,476. TD 7,568 ft. PB 5,770 ft. Completed as shut in gas well.

Morgan County: Petroleum Inc. 1 L. J. Clar, SE NE NW 24-1n-58w. IPF 12 BOPH. "D" sand discovery—new field. Skull Creek 5,866. TD 5,870 ft.

Rio Blanco County, Urado: Continental Oil & English Oil 2 Government, NE NE SE 30-3s-103w. Dry. "B" sand 3,576. TD 4,052 ft.

Washington County: George Johnson Drilling Co. 1 State, SE NW NW 16-4s-53w. Dry. "J" sand 4,626 ft. TD 4,688 ft.

R/M Appoints Hoffman District Sales Manager

Appointment of S. V. V. Hoffman as district manager, West Coast sales district, of Raybestos-Manhattan, Inc., has been announced by the company's executive offices at Passaic, N. J.

Hoffman will supervise sales of industrial rubber products, mechanical packings and asbestos textiles with sales staffs at Los Angeles, San Francisco, and Seattle where offices and warehouses are maintained.

Hoffman will continue to have headquarters at Los Angeles where he has been in charge as regional manager since 1951. He started with Raybestos-Manhattan in 1939, and was a salesman for the company's New York branch unitil 1947 when he joined the San Francisco sales force.

Petrocarbon Chemicals To Build Houdriformer

Houdry Process Corp. has announced that Petrocarbon Chemicals, Inc., will build a 1,000-bbl. per day Houdriformer at its Irving plant located near Dallas.

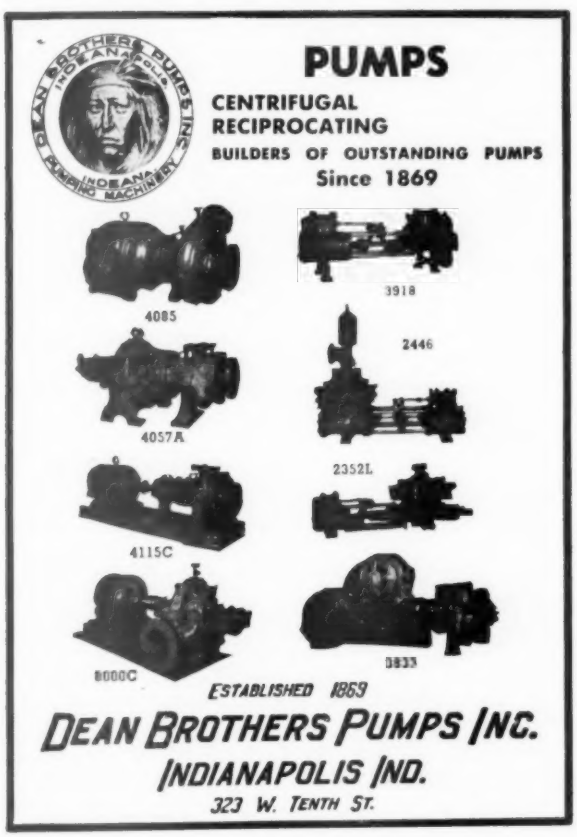
The new reformer is designed for a considerable degree of flexibility required for its projected use in petrochemical service and high-octane fuels.

Tears Engineers, of Dallas, will handle the engineering and construction of the Houdriformer, with completion scheduled for mid-1954.

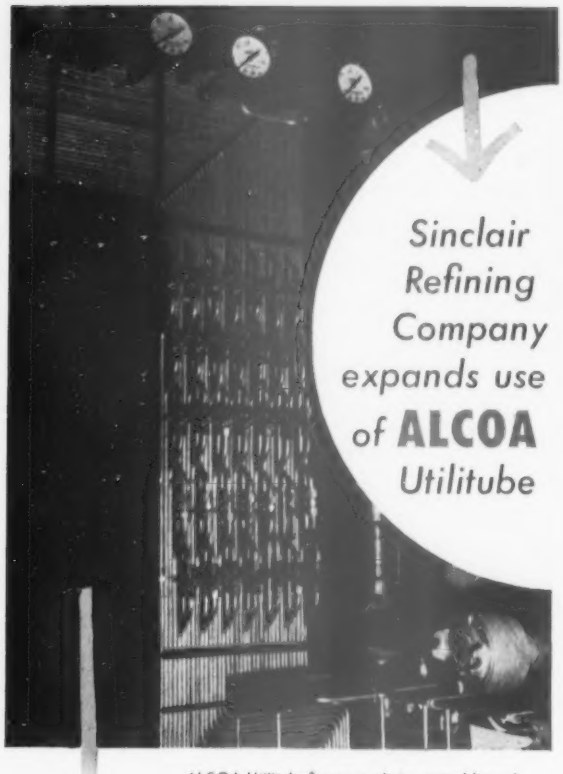
Combustion Control Corp. Promotes Lovendahl

Combustion Control Corp., Boston, manufacturer of Fireye flame failure safeguards, has announced the appointment of Arne Lovendahl as manager of its Philadelphia area office.

Lovendahl is a mechanical engineering graduate of Northwestern University. He was formerly employed by Crane Co., and by Marshall Oven Co., Chicago, as chief engineer. For the past 2 years he has been with Combustion Control as sales engineer in the Chicago area.



USE KINZBACH MILLS
for every cutting or milling job
Type "A" Mill
Type "D" Mill
Type "H" Mill
Type "I" Mill
Use Kinzbach Milling Tools for every whipstocking or metal cutting operation. Bodies are made of high quality steel, shaped for best cutting results. They have high-speed tool steel inserts which are ground and set at the most efficient angle for fast, uniform cutting action. Shown here are four popular models—see your Kinzbach Catalog for a description of the complete series of Kinzbach milling tools.
KINZBACH TOOL CO INC
Export Office: 74 Trinity Pl. New York, N.Y.
KINZBACH TOOL CO., INC. • P. O. BOX 277 • HOUSTON, TEXAS



Sinclair Refining Company expands use of **ALCOA** *Utilitube*

ALCOA Utilitube* serves air to control board instruments at Sinclair's Light Oil Treating Plant, Houston, Texas. Satisfactory operation of two other Alcoa Aluminum Coiled Tube installations prompted this new installation.

USE ALCOA UTILITUBE for fuel and lube lines, for hydraulic fluids, for air and refrigerants. It will not gum or sludge in petroleum service, nor will it discolor or contaminate the fluid it carries.

USE ALCOA UTILITUBE TO SAVE MONEY. It's the lowest cost corrosion-resistant metal tube you can buy . . . may very easily cut your tube costs by 40 per cent!

ALCOA UTILITUBE forms, flares and bends as easy as annealed copper yet work hardens less. At sub-zero temperatures it actually gets stronger!

ALCOA UTILITUBE AND FITTINGS are available from your aluminum distributor. For complete information, write for the booklet: "Alcoa Utilitube."

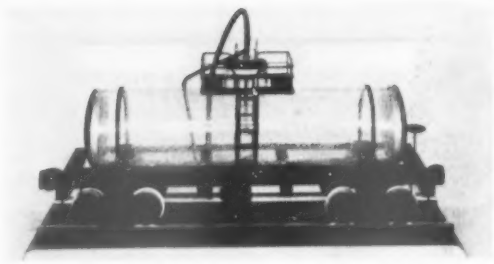
ALUMINUM COMPANY OF AMERICA
1003-L Alcoa Building, Pittsburgh 19, Pa.

*Registered Trademark, Aluminum Co. of America

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

This unit makes light work of tank car cleaning



SO LIGHT one man can carry it—yet it does the work of a whole crew, in half the time. It's the new Oakite Fogging Unit, and it's making tough tank car cleaning a simple job.

No more brushing or scraping out—the unit does the work. Just suspend it in the dome of the tank, hook it up to the cleaning solution and steam lines. Unit automatically picks up the solution, mixes it with steam, turns loose a detergent-saturated fog that quickly penetrates and loosens moderate soils. A rinse through the nozzles floats the dirt off all interior surfaces, leaves tanker ready for service.

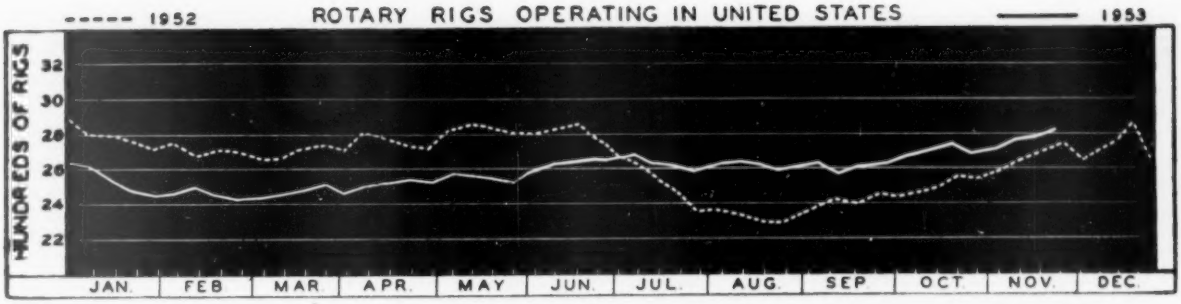
You can rent the Oakite Fogging Unit at a nominal fee. Just ask your Oakite Technical Service Representative, or write Oakite Products, Inc., 50B Rector St., New York 6, N. Y., for free handbook describing this, other modern Oakite cleaning methods.

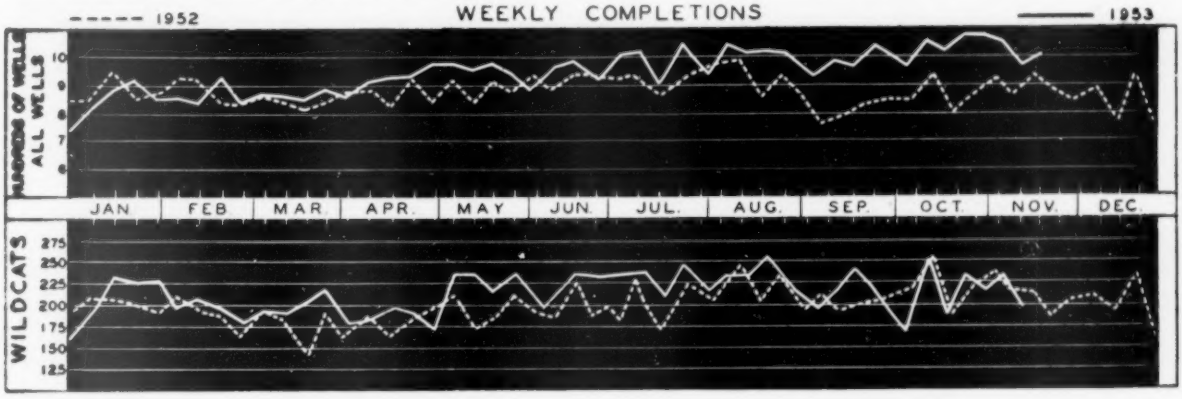
SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS · METHODS · SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada





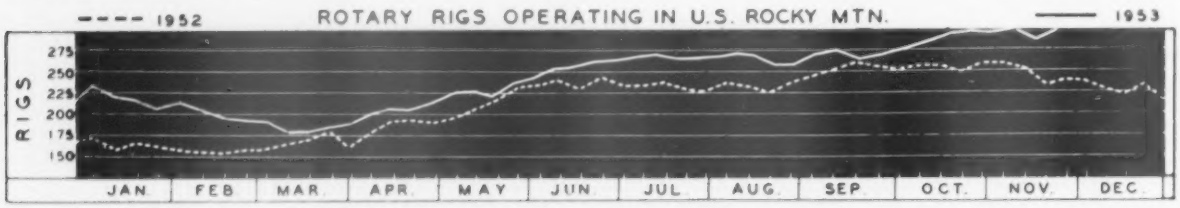
CURRENT STATISTICS

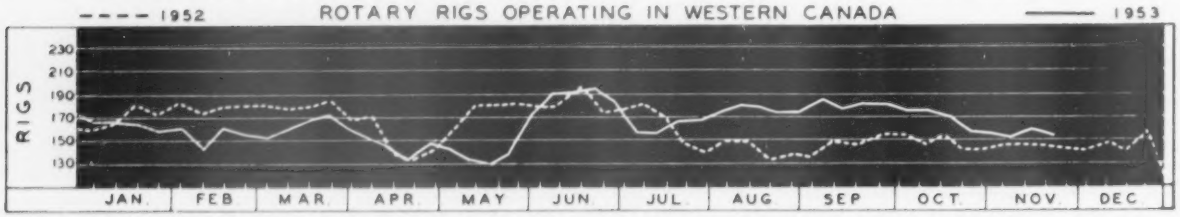
EXPLORATION

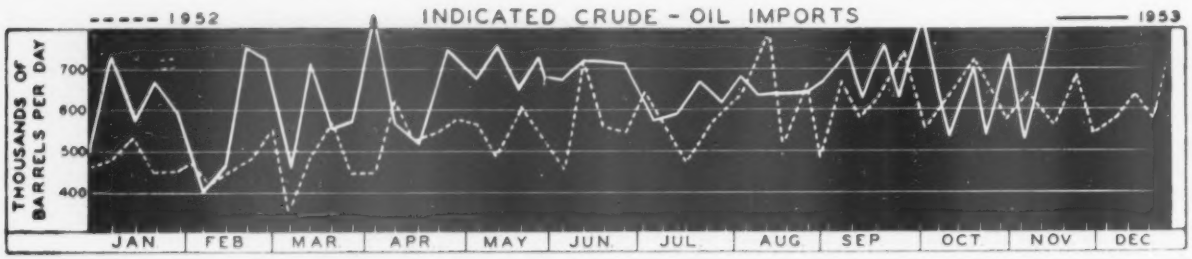
WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 21, 1953

	Total of all wells					Nov. 21		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	22,550	679	694	0	0	0	0	0	0	0	0	0	0
Pennsylvania	39	19	5	†15	86,378	1,707	1,712	0	0	0	0	0	0	0	3	12	15
West Virginia	12	1	10	1	29,862	554	531	0	0	0	0	0	0	0	11	7	18
Ohio	18	8	4	‡6	34,309	945	940	0	0	0	1	1	2	0	4	14	20
Indiana	37	16	0	21	59,155	1,180	1,147	0	0	0	0	0	12	0	2	318	332
Kentucky	30	16	4	10	48,100	1,034	1,180	0	0	0	0	0	8	0	1	171	180
Illinois	65	44	0	21	173,610	1,873	1,917	0	0	0	0	0	5	0	0	364	369
Michigan	11	7	0	4	32,866	555	632	0	0	0	3	3	16	0	5	228	249
Kansas	84	49	8	§27	283,336	4,292	4,046	3	0	1	8	12	83	0	33	676	792
Nebraska	3	1	0	2	11,429	284	260	0	0	0	2	2	16	0	5	119	140
Oklahoma	147	80	6	¶61	463,003	6,659	5,193	1	0	2	2	5	105	6	32	536	679
Texas	306	167	6	133	1,478,000	15,243	15,435	16	2	1	78	97	767	57	154	3,754	4,732
North Central (Dist. 7-B & 9)	114	59	0	55	450,589	5,772	5,027	7	0	0	34	41	400	0	17	1,496	1,913
West (Dist. 7-C & 8)	76	52	0	24	391,288	3,315	4,599	3	0	0	11	14	162	2	13	608	785
Panhandle (Dist. 10)	0	0	0	0	0	672	583	0	0	0	0	0	0	2	0	18	20
Eastern (Dist. 5 & 6)	12	1	2	9	69,075	715	717	0	0	0	6	6	20	2	5	238	265
Gulf Coast (Dist. 2 & 3)	50	24	2	24	335,354	2,234	2,336	1	1	1	14	17	91	24	65	606	786
Southwest (Dist. 1 & 4)	54	31	2	21	231,694	2,535	2,173	5	1	0	13	19	94	27	54	788	963
Louisiana	62	33	5	24	310,065	2,481	2,111	1	2	0	7	10	73	33	20	331	457
Northern	39	23	5	11	108,561	1,109	1,147	0	0	0	2	2	11	2	2	140	155
Southern	23	10	0	13	201,504	1,372	964	1	2	0	5	8	62	31	18	191	302
Arkansas	10	3	0	7	49,091	497	369	0	0	0	1	1	12	0	0	115	127
Mississippi	16	7	0	9	114,405	358	316	3	0	0	8	11	20	1	5	156	182
Southeastern States	6	0	0	6	23,287	132	71	0	0	0	4	4	1	0	0	107	108
Montana	13	4	0	9	58,362	393	291	0	0	0	7	7	12	0	0	103	115
Wyoming	25	23	0	2	116,896	737	608	0	0	0	1	1	24	0	3	119	146
Colorado	23	10	2	11	116,973	635	414	2	0	1	7	10	27	0	12	275	314
Utah	2	0	0	2	6,471	64	71	0	0	0	2	2	3	0	4	34	41
New Mexico	34	12	19	3	163,720	1,269	923	1	0	0	2	3	23	1	15	116	155
California	40	23	1	16	160,495	2,283	2,165	0	0	0	14	14	62	0	11	507	580
North Dakota	8	3	1	4	42,658	241	98	0	0	1	4	5	9	0	1	68	78
Miscellaneous (S. D.)	1	0	0	1	7,318	72	123	0	0	0	1	1	1	0	4	44	49
Total United States	1,006	533	71	402	3,892,339	44,167	41,247	27	4	6	152	189	1,281	98	325	8,174	9,878
Total previous week	967	541	52	374	3,672,572			20	3	6	169	198	1,254	94	319	8,022	9,689
Total November 22, 1952	893	457	59	377	3,558,415			20	2	4	160	186	1,237	74	227	7,783	9,321

Service wells included: *7, †12, ‡2, §1, ¶9.



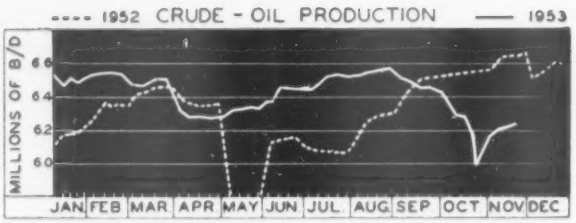


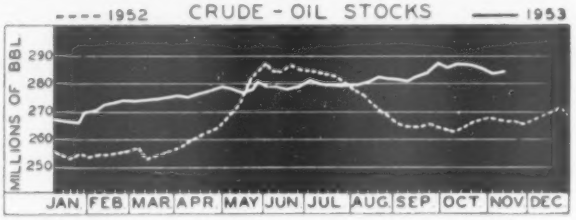


DAILY AVERAGE PRODUCTION FOR WEEK

	November 21			Nov. 14
	Crude oil	Lease condensate	Total	total
Alabama	4,800		4,800	4,700
Arkansas	80,800	700	81,500	75,900
California	998,600		998,600	999,400
Colorado	107,400		107,400	105,400
Eastern	59,500		59,500	59,500
Florida	1,500		1,500	1,500
Illinois	167,900		167,900	168,700
Indiana	34,200		34,200	36,300
Kansas	315,300		315,300	289,550
Kentucky	32,700		32,700	32,500
Louisiana	645,650	38,400	684,050	680,800
North	105,150	3,400	108,550	105,300
South	540,500	35,000	575,500	575,500
Michigan	33,900		33,900	32,100
Mississippi	91,800	3,600	95,400	91,950
Montana	32,400		32,400	32,700
Nebraska	12,900		12,900	12,800
New Mexico	205,000	750	205,750	205,750
Oklahoma	521,400		521,400	517,600
Texas	2,572,700	47,225	2,619,925	2,619,925
Dist. 1	38,300	400	38,700	38,700
Dist. 2	137,075	6,000	143,075	143,075
Dist. 3	418,200	23,800	442,000	442,000
Dist. 4	241,350	5,900	247,250	247,250
Dist. 5	45,200	450	45,650	45,650
Dist. 6	115,250	5,100	120,350	120,350
East Texas field	239,000		239,000	239,000
Dist. 7-B	118,000	50	118,050	118,050
Dist. 7-C	155,525	4,125	159,650	159,650
Dist. 8	803,875	1,000	804,875	804,875
Dist. 9	184,425	350	184,775	184,775
Dist. 10	76,500	50	76,550	76,550
Utah	4,700		4,700	4,600
Wyoming	216,000		216,000	234,200
North Dakota	14,100		14,100	14,200
Total U. S.	6,153,250	90,675	6,243,925	6,220,075
Change from previous week			up 23,850	
Canada	277,900		277,900	261,875
Total U. S. production January 1-November 21			2,103,913,300 bbl.	
Same period last year (crude plus cond.)			*2,028,072,650 bbl.	

*Includes 27,386,135 bbl. condensate.





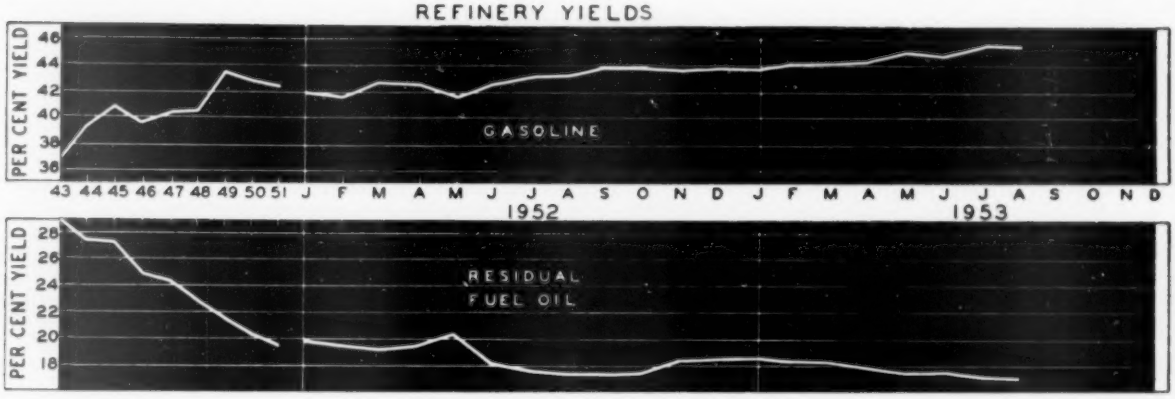
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

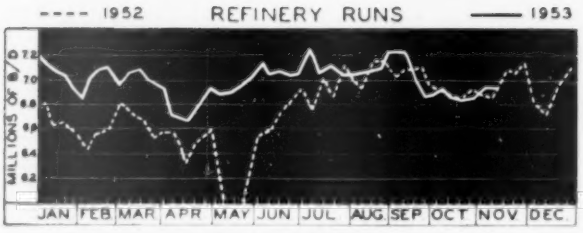
(Thousands of barrels)

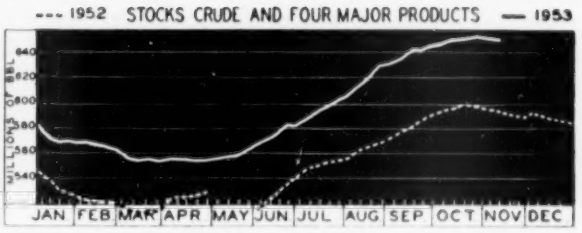
	Nov. 14, '53	Nov. 7, '53	Nov. 15, '52
Pennsylvania Grade	2,780	2,826	2,321
Other Appalachian	1,750	1,739	1,843
Illinois, Indiana, Michigan	12,352	13,067	12,190
Arkansas	3,402	3,119	3,077
Louisiana	17,354	16,668	15,859
North	3,108	2,937	2,486
Gulf	14,246	13,731	13,373
Mississippi	3,525	3,586	3,019
New Mexico	8,691	8,972	7,400
Oklahoma and Kansas	38,638	39,636	37,827
Texas	134,688	134,093	130,599
East Texas	12,063	12,026	11,946
West Texas	58,960	59,846	59,518
Texas Gulf	28,258	28,905	26,286
Other Texas	35,407	33,316	32,849
Rocky Mountain	17,251	16,816	14,844
California	32,613	32,788	30,302
Foreign	†11,888	10,505	7,381
Total	284,932	283,815	266,662

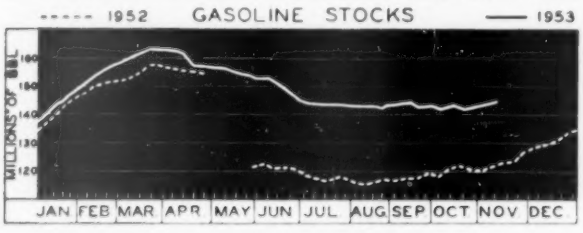
*Bureau of Mines. †Includes 3,983,000 bbl. in California.

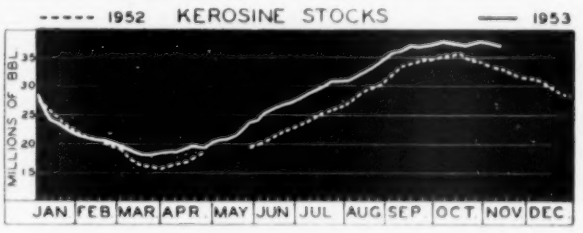
REFINERY YIELDS

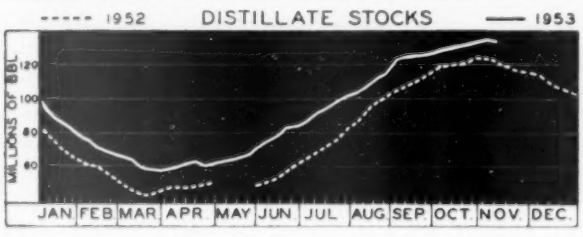


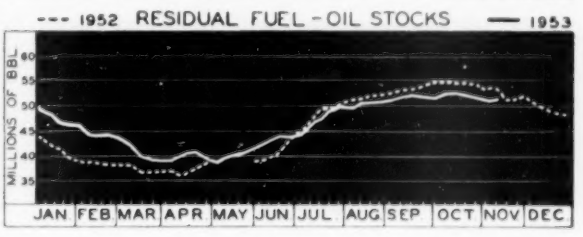




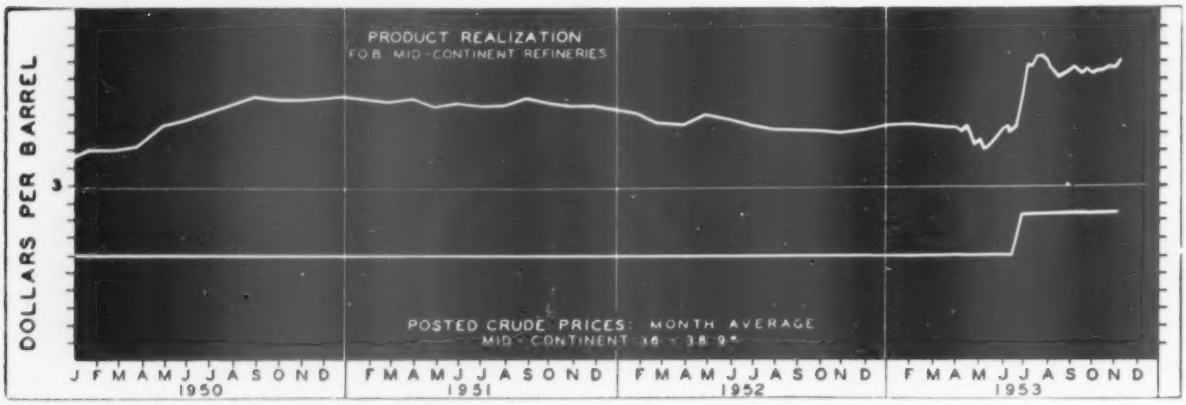








Since press time was advanced 1 day because of the Thanksgiving holiday, the regular weekly A.P.I. report could not be included in this week's issue. Complete tables for 2 weeks will be carried next week.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.72 for week ended November 14, $3.67 for previous week, and $3.36 for November 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of November 24, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11-11.5	12.75-13.8	11-11.75
Premium gasoline	12-12.5	14.25-14.8	12-12.75
42-44 w.w. kerosine	8.875-9.25	10.4	9-9.5
No. 2 straw fuel oil	7.875-8.25	9.4	8-8.5
No. 6 residual	$1.40-1.55	$2.25-2.40	$1.85-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.5	5.0	5.25
Grade 18-55	6.6	6.10	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-21.5
200 vis., No. 3 neutral, 0-10 pp.	14.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	21.5
180 vis., 10 p.t. neutral	25.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

THE drop in prices posted for kerosine and distillate fuels on the East Coast, started by Esso Standard Oil Co. on November 20, was recognition of the weakness in the heating-oil market on the East Coast that has existed for many months and was not due to any sudden change in market conditions. The new quotation for barge delivery of No. 2 in New York Harbor is 9.4 cents a gallon.

Quotations for barge delivery of No. 2 fuel have been 9.9 cents a gallon. These were formal quotations on which many contracts were based. However, distillate has been available on the spot market at 9.4 cents or less at all times since formal quotations moved up 0.5 cent with the withdrawal of the voluntary allowance at the end of September. At the time of the September increase, some marketers expressed opinions that it would take some early cold weather to sustain the heating-oil market at quoted levels. Weather in some of the important distillate-consuming areas has been about 25 per cent warmer than last year.

Unconfirmed reports indicate that some distillate from the Group 3 area is moving at prices slightly under the market, but the general attitude of suppliers seems to be that heating-oil weather will come in time to prevent a general break in the market.

Group 3 gasoline is continuing the gradual trend toward a weaker market. Movement out of pipe-line terminals has been very good, but runs and gasoline yields have been maintained at such a high level that the heavy backlog of inventories continues to keep pressure on the market.

Heavy fuel continues to gain strength in the Mid-Continent and North Central marketing areas. Some of the larger suppliers in these areas have oversold residual for November and December and have had to make purchases on the spot market to cover the difference. Bidding by these suppliers has further strengthened the market.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.50		$2.37
21-21.9	2.30	2.52		2.39
22-22.9	2.37	2.54		2.41
23-23.9	2.45	2.56		2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective September 21, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.05
Southwest Pennsylvania	3.61
West Virginia	3.55
Ohio	3.54
Illinois Basin	3.02

CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

UNDISPLAYED CLASSIFIED 20c a word one issue. 10% Discount three or more consecutive issues. $4.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

DISPLAY CLASSIFIED
$14.00 a column inch one issue . . .
10% Discount three or more issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

N-80 TUBING
11,000 ft. of new 2½ inch upset N-80 Jones & Laughlin Integral-joint. Pete Thomas. Phone 4-6455 or 6-8075, 1408 Philtower, Tulsa, Oklahoma.

ONE WORTHINGTON 315 Skid Mounted Compressor complete for pumping natural gas. This is a two stage Compressor from 0 to 125# pressure, capacity 315 cu. ft. per minute. Used very little. For price inquire A. V. Hoenig, 1708 Philtower Building, Tulsa, Oklahoma.

Gase Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

USED LINE PIPE

15 miles 10¾" OD Electric Weld 28.04# PE BFW. Approx. length 37'. 51 miles 8⅝" OD Seamless 23.57# PE BFW. Approx length 35'. 6 miles 6⅝" OD Seamless 17.02# PE BFW. Approx. length 35'. We consider the above first-class merchandise.

BETHLEHEM SUPPLY CO.
BOX 2171, TULSA, OKLAHOMA
PHONE 5-9261, EXT. 361

New 9⅝"
O. D. PIPE
Electric Weld
5/16" and ⅜" Wall
40 foot lengths
Approximately 5,000 feet
Special Low Price
Also 16, 20, 24, 28 and 30" diameter available
Write—Wire—Phone
Sonken-Galamba Corporation
2nd and Riverview (X-998)
Kansas City 18, Kansas
ATwater 9305

EQUIPMENT FOR SALE

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

REDA PUMP complete w/ #4—20 Motor, 45½ H.P., 650 Volt, 41.6 Amps. #90—Pump Housing, #5595—Switchboard w/recording Ammeter 3400'—#4 Cable 125 Amp. Auto Transformer Accessories. Engine 225 H.P. Climax Type R-225 on Skid. Alternator G. E. 125—KVA, 100 KW, 440 V. A. C. w/Transformer, Flexible coupling and skid base. House—10' x 18' wood frame, w/G.I. Roof and Siding on Skid. Engine—165 Hp. Climax R-61 on Skid. Herndon Drilling Co., 421 Mayo Bldg., Tulsa, Phone 4-9700.

FOR SALE: Bucyrus-Erie Model 24-L Spudder, Trailer Mounted, Tool Crane, Casing Tackle Strut, Guy Lines, Turnbuckles, Casing Line and Casing Blocks and Hook. Buckeye Supply Company, 18 Harrison Street, Zanesville, Ohio. Phone 2-3641.

USED EXCELLENT CONDITION IN OPERATION
One Each (4¾" to 1") (8⅝" to 2⅜") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

OILFIELD SALVAGE CO., INC.
Phone CHarter 6914
P. O. Box 2589 Houston

FOR SALE

48,000 FEET 5½" OD x 15½, LT&C, J-55, API, Range 2, Seamless Casing at

$1.55 per ft.

Houston, Tex.

BARON TUBE CO.
P.O. Box 104, Sta. D,
Atlanta, Georgia

EQUIPMENT FOR SALE

FOR SALE: 10,000'—4½" drill pipe, with tool joints cut off, located at Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

FOR SALE: 30,000' of 3½" O.D. 9.20# 10-Rnd. Thd. Range 2 #1 Used Seamless Oil Well Tubing, just pulled from gas wells. 75% of this material still has the stencils visible. We will load on cars F.O.B. Canton, Ohio, at .78c per foot. SERVICE PIPE & SUPPLY CO., INC., 2800 West Tusc., Canton, Ohio. Phone No. 2-1332.

FOR SALE: One 42 Cyclone—2 years old, mounted on International truck, both in very good condition. Machine 3 years old, has Bucyrus-Erie Beam and Rubber Shock Absorbers in mast. Glenn Hottal, R. #2, West Salem, Ohio. Phone Congress 5442.

FOR SALE: Approximately 3600 ft. of 4½" 16.60# drill pipe with Hughes Flash-weld extrahole tool joints. Model BC-6, 200 ton Emsco Swivel. Melton Supply Company, Box 1360, Seminole, Oklahoma.

FOUR Kewanee Oilfield Boilers, 125 H.P. 300 lbs. W. P. Drilling Equipment Mfg. Co., Box 4728, Oklahoma City, Okla.

DISSOLVING PARTNERSHIP
Shallow drilling rig complete with 14 wells located Lavernia, Texas. If interested write for details and inventory.

R & R DRILLING CO.
336 Quill Drive East
San Antonio, Texas

FOR SALE
USED TUBING & CASING

60,000' 2⅜" OD EUE 4.70# R-2 10V Thread Seamless Tubing. 6000'—7" OD 22 and 24# 10V Thread R-2 Seamless Casing. All of the above Cold Water Tested to 3000#.

SABINE PIPE & SUPPLY CO.
P. O. Box 111, Phones 3094-3095
Kilgore, Texas

FOR SALE

Complete Rotary Drilling Rig—Emsco 350 Draw Works with three Wakdu Waukesha drive——New Oil Well 7¼ x 14 Pump——120 ft. Lee C. Moore mast. Now operating near Chinook, Montana. Rock Bottom Price.

Chas. Beu

NORTHERN PUMP CO.
Chinook, Montana

EQUIPMENT FOR SALE

FAILING model heavy duty 1500 drill and water truck. Write to Box 819, Longmont, Colorado, for details.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

ONE—5½ X 5½ X 12 Ingersoll-Rand Type XVG-1 Serial No. 4DV782 Direct coupled, 150 H.P. Gas Engine Driven Gas Compressor with (2) fixed Volumn clearance pockets, 1 MU-1 Maxim exhaust silencer, Air Maze Oil Bath type engine Air Filter and Manifold with valves adjacent to engine. 400# working pressure. Price $4,500.00. One 18" X 25'—9" Stabilizer tower heat exchange, etc. Used for removing 20# gasoline from Raw Propane and heavier mixture. Rated capacity 700 gals. per hour. Price $2,500.00. One—Natural gas scrubber 24" dia. X 10' with 6" flanged openings, 500# working pressure. Price $350.00. All prices F.O.B. Campbell, Wyant & Cannon Foundry Co., Muskegon, Michigan.

3800' 2⅞" O.D. 6.50# J-55 Rge 2 Smls Tubing W/Type "A" Hydrill thd. Arnold Pipe & Supply Co., 3815 Greenwood Rd., Shreveport, La.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

NOTICE: We buy, We sell equipment everywhere. If you want to sell or buy contact Pressey & Son, Pueblo, Colorado

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

EQUIPMENT NOT IN USE. Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

EXPERIENCED GRADUATE ENGINEER with electrical and instrumentation background for engineering department of Southwest Refinery. Box G-785, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2003, Tulsa, Okla. $5.00 cash.

RAPIDLY EXPANDING major oil pipe line has an opening for a graduate accountant for tax and special accounting work. Location is North Central United States. Please include full resume of education, experience, age and salary expected. Address reply to Box G-796, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER

Age 35-45. Full responsibility design and new construction. Gulf Coast refinery. Substantial refinery experience essential. Send replies in confidence to Box G-788, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE MANAGER

Man with experience in refinery payroll, credit, traffic, and general accounting to head office personnel of new refining company located in Chicago area. Give complete details of experience, availability and salary desired in first letter.

Box G-792
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

WE MAKE LISTS showing where to apply for oil industry jobs. Write us. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

MANUFACTURERS' representatives: To represent manufacturer of proved liquid level gauges to oil industry, foreign and domestic. Write full details: W. S. Olson, Suite 1111, 4753 North Broadway, Chicago, Illinois.

SEISMIC SUPERVISOR required by expanding and aggressive seismic contracting company. Should have ability to supervise any domestic area and have good professional contacts. Minimum requirements, college degree in geophysics or related fields and eight years' seismic experience. Good future. Tulsa location. Box G-705, The Oil and Gas Journal, Tulsa, Oklahoma.

RAPIDLY EXPANDING major oil pipe line has an opening for a graduate engineer for general pipe line engineering work. Location is North Central United States. Please include full resume of education, experience, age and salary expected. Address reply to Box G-795, The Oil and Gas Journal, Tulsa, Oklahoma.

SOUTH AMERICA. Major Oil Company. Our fee paid. Mechanical Engineer—Petroleum Engineer—Chemical Engineer—Geologist—All requiring Degree, experienced or inexperienced. Mud Technician—two or more years' experience, single. Tool Pusher—under 40, three years' experience. Accountant—Degree, Accounting major, single. All information confidential. Contact CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5168.

CHIEF CHEMIST experienced in Pod column work and gasoline plant process and product control testing to take charge of laboratory located at large gasoline plant in West Texas. Housing furnished and salary to be commensurate with qualifications of applicant. Please furnish experience record and salary expected. Our employees have been notified of this advertisement. Box G-776, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED COMPUTER wanted by established contract company. Degree in geology or related sciences helpful, but not essential. Salary commensurate with experience and ability. All replies held in strictest confidence. Include details of experience and education. Box G-769, The Oil and Gas Journal, Tulsa, Oklahoma.

LEADING FLANGE MANUFACTURER HAS OPENING for experienced man to call on Refineries, Utilities, Tank Fabricators and Ship Building Industry in New York and New Jersey areas. Write in confidence to Box G-801, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

ENGINEER CHEMICAL

(CHEMICAL OR PETROLEUM DEGREE)

Petroleum company in New York metropolitan area seeks staff advisory engineer; 5 years' experience in refinery or research lab. To age 35. Give resume. Box OJG 118, 221 W. 41 St., New York City.

TECHNOLOGIST
CHEMICAL ENGINEER

30-35 to specialize in study of new methods and processes. Gulf Coast location. Comparable experience preferred. Send replies in confidence to Box G-787, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL PRODUCTION

WILL GO IN ON any kind of oil deal, settled production to wildcat provided it is right. Give complete details in first letter. P. O. Box 6301, St. Petersburg Beach, Florida.

SITUATIONS WANTED

PETROLEUM CHEMIST: Fifteen years of varied and extensive experience with petroleum raw materials and products. Mostly research and development. Some engineering training and experience. Box G-799, The Oil and Gas Journal, Tulsa, Oklahoma.

AIR LINE EXECUTIVE PILOT, twenty thousand hours, sixteen years air line captain, six years corporation executive pilot, excellent record, references, desires flying position. George R. Farnham, Route 2, Longview, Texas. Phone 5151.

WOMAN GEOLOGIST, age 29, seven years petroleum experience in subsurface (micropaleontology, stratigraphy, and structure) desires challenging position. Box G-806, The Oil and Gas Journal, Tulsa, Oklahoma.

MANUFACTURER'S AGENT with excellent sales record, college education, engineering and mechanical background, can represent one more manufacturer in the state of Oklahoma. Box G-805, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Graduate of the University of Texas, 22 months' experience with major oil company, 15 months in the Permian Basin. 26 years old, married. Desires responsible position with active independent. Box G-803, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, B. S., 28. Five years' refinery engineering and operating experience. Desires engineering or supervisory position with a refinery, petrochemical or engineering organization. Box G-804 The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, B.A. Degree, 12½ years surface, subsurface experience, mostly in Rockies. Age 34, married, currently employed. Desires permanent position with aggressive independent or consultant in Casper, Billings, Denver. Box G-798, The Oil and Gas Journal, Tulsa, Oklahoma.

DRLG. SUPT.: Nine years' experience all phases drilling and well completion. Gulf Coast, offshore, Mid-Cont., Okla., Kans., Colo., Neb. & Wyo. Plus one year in South America. Dual and triple zone well completion and reservoir engineering. Have been in oil work since 1934. Graduate Petroleum Engineer. Box G-731, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION FOREMAN interested in foreign work. Speaks Arabic and some Spanish. Can furnish references. Box G-793, The Oil and Gas Journal, Tulsa, Oklahoma.

RELOCATE: GEOLOGIST, 26, 3 years concentrated fieldwork (Rotary Completions) and some subsurface experience in Mid-Continent area, desires position in Rocky Mountain area. Box G-794, The Oil and Gas Journal, Tulsa, Oklahoma.

MATERIAL MAN: Experienced in Physical Inventory, Control, Pricing, Purchasing, Field and general office work. Go any place in oil field. Box G-800, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 1628, Ph. No. 3-3141, Hobbs, New Mexico.

EXECUTIVE—CERTIFIED PUBLIC ACCOUNTANT—COLLEGE DEGREE offers 17 years' experience in developing and managing oil and gas properties, operating hydrogen recovery plants. Familiar with taxes, financing, marketing, lease arrangements, joint ventures. Seeking responsible position in Houston. George D. Blocher, 3638 Wichersham Lane, Houston 19, Texas.

CHEMICAL ENGINEER: Broad refinery operating and pilot plant experience. Process engineering on refineries, petrochemical plants. Desire to relocate south-southwest. Box G-782, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, 31, married; 5 years' varied experience in Rocky Mtns., with consultant and major company, desires position with independent company or consultant. Box G-783, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

CHEMICAL ENGINEER, age 40, twenty years' experience in the operation and design of Gasoline Plants, Refineries and Petro-Chemical Plants, specialized in the design and operation of high purity ethylene plants. Desires responsible position with a progressive Oil Company. Box G-791, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

RANCHES

SOUTHERN OREGON STOCK RANCH

776 Acres in Rogue River Valley. Free water for over 130 acres. Many open meadows. Balance in good stand fir and pine. Live stream. Secluded yet within easy reach of ready markets. Complete line of modern equipment, 2 sets farm buildings plus ranch headquarters. New massive early American home. Modern feed barn 650 ton capacity. Repair shop and storage for equipment. Fenced and cross-fenced. Ideal purebred operation. For full information write

VALLEY FINANCE CO.
P. O. Box 135
Grants Pass, Oregon
Price $225,000.00

PRODUCTION WANTED

PRODUCTION WANTED

Will pay cash for management block or controlling stock of producing company with upwards of 500 barrels daily oil, or equivalent gas, production. If desired will consider term contract with capable management personnel. No brokers but will open discussions with authorized representative of undisclosed principals.

Box G-786
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FINANCING

GAS FINANCING

We finance the installation of gathering systems, compressor stations, processing plants, etc., and purchase casinghead and natural gas.

Well owners are paid for their gas and also participate in operations. Reply in confidence to

Box G-802
The Oil and Gas Journal
Tulsa, Oklahoma

ROYALTIES

FREE TAX INFORMATION for those desiring to sell their producing royalties, overrides or production. Robert L. Kinkaid, Box 26, Tulsa, Oklahoma.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column use a Journal classified advertisement to find it. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

600 ACRE Lease Eastern Kentucky. One well Berea Sand excellent prospect for fracturing. Will assign one-half interest for capital to further develop. Box G-781, The Oil and Gas Journal, Tulsa, Oklahoma.

LISTS FOR SALE of leases and promotion of oil deals. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver Colorado.

SEE A. L. Bowles, Rollow Building, Ada Oklahoma, for drilling deals.

FOR SALE: 100 acres, one producing well. Shipping $375.00 monthly. Proven locations. Dutcher sand at 1100 ft. Located Wagoner County, Oklahoma. Well drilled 1935. Other settled leases available at this time. F. E. Brown, Box 64, Coweta, Oklahoma. Telephone 145.

WILL CONSIDER DEVELOPMENT and exploration of large acreage lease. Must be of considerable acreage, or not interested. Box 22, Emmaus, Pa.

2,000 ACRE 5 year leaseblock, Noble County, Oklahoma. Ready to drill this year. Excellent geology. Robert L. Kinkaid, Box 26, Tulsa, Oklahoma.

DRILLING DEALS: Have acreage in South Central Kentucky. Looking for partner. Leases on well defined structures. See Journal, November 16th issue data this section. Box G-781, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 160 acres minerals, Williston Basin, Dunn County, North Dakota. Description: S/2 section 17 and N/2 section 20, Township 142 North, Range 95 West. Being 640 land acres. Under oil and gas lease to Magnolia Petroleum Company. Write for price. Geo-Tran Exploration Company, 2528 Rogers, Fort Worth, Texas.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

EXPLORATION SERVICE

DIRECT METHOD OF OIL LOCATION

A method that locates the oil body whether in a stratigraphic deposit or in a structural deposit.

Has been developed and proven during 49 YEARS of practical field research and operations.

NOT an experiment nor a theory.

For information address:
P.O. Box 1528, Tulsa, Oklahoma

REAL ESTATE

COMPLETELY EQUIPPED fireproof garage, 2000 sq. ft., 2 gas pumps and tanks. Plenty of outside storage with trackage. Ideal for pipe line or supply maintenance. For sale or lease. Okla. City Box 7098. Phone WI 3-4451.

ON NEW BYPASS easily accessible for heavy equipment 3000 sq. ft. air-conditioned office space, 6 private offices. Plenty of warehouse space, open storage and parking. Adjacent to trackage. Ideal for pipe line or supply operation. Box 7098, Okla. City. Phone WI 3-4451.

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

ELECTRICAL CONTRACTORS

Office Phone	Res. Phone
5-5315	7-4950

W. L. RATCLIFF COMPANY
ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution

W. L. Ratcliff	**506 Caddo St.**
P. O. Box 373	**Shreveport, La.**

Lane-Wells Co. Moves Gulf Coast Personnel

In a series of moves designed to provide better service for customers of the Gulf Coast division, Lane-Wells Co. has announced new personnel appointments.

Moving to Houston to assume the job of division sales engineer is Harry Vaughan, formerly district sales engineer at Corpus Christi, Tex.

Replacing Vaughan at Corpus Christi is Ned H. Phillips, who has been district sales engineer at Lake Charles, La.

Paul H. Falder has been appointed district sales engineer at Lake Charles to replace Phillips.

Graham Manufacturing Names Mains Vice President

Graham Manufacturing Co., Inc., of New York City, manufacturers of steam jet ejector vacuum equipment and special types of heat-transfer apparatus, has announced the appointment of William D. Mains as vice president in charge of sales.

Mains, a graduate of University of Louisville in 1937, became associated with Graham Manufacturing Co., in 1946 as a member of the sales department, and since that time he has been connected with sales engineering work. Mains will cover the entire United States and certain foreign countries for the company in this capacity.

EQUIPMENT MEN . . . in the News

Lunkenheimer Sales Representatives Attend Conference

In attendance at The Lunkenheimer Co. sales conference, recently held in Cincinnati, were, top row: G. E. Regensburger, G. V. Badders, R. T. Klein, M. E. Tomlinson, E. C. Rood, A. Williams, D. D. Sharer, C. R. Glennon, A. C. Hiemenz, and W. M. Donovan. Middle row: R. G. Thomson, D. G. McCauley, W. K. DePass, III, A. Bear, Jr., S. Trier, J. A. Hare, D. Ladewig, J. J. Moran, J. J. Merhar, F. H. Taylor, R. C. Hentscher, and T. H. Pyle. Bottom row: M. W. Pauly, C. E. Smith, H. A. Burdorf, J. O. Galloup, E. T. Toerner, N. E. Petty, J. F. McManus, W. T. Nowaskey, J. R. Mino, E. F. Horrigan, R. D. May, E. W. Berry, W. E. Shurtz, J. E. Lynch, G. W. Lambertson, E. A. Benisch, D. C. Jones, Jr., and H. H. Layritz.

Distributor sales representatives from seven states attended an intensive 2-day sales training course at The Lunkenheimer Co., Cincinnati, recently. Held at the company's general office building, the conference was attended by 32 sales representatives from 13 Lunkenheimer distributors in Connecticut, Indiana, Louisiana, Massachusetts, Michigan, Maryland, Missouri, Ohio, and West Virginia.

Tours of the two Lunkenheimer plants—Fairmont, devoted to the manufacture of bronze valves; and Carthage, devoted to the manufacture of iron and steel valves — highlighted the 2-day conference.

The conference was under the direction of Melvin W. Pauly, sales manager, eastern and western division, and Harold H. Layritz, sales manager central division. They were assisted by company sales representatives Robert G. Thomson, Donald D. Sharer, Theodore H. Pyle, David C. Jones, Jr., A. F. Meyer, and George W. Lambertson.

Dravo Awarded Contract By Colorado Interstate Gas

A contract for 27 compressor headers has been awarded Dravo Corp., piping department, Pittsburgh, by Colorado Interstate Gas Co.

These units, to be fabricated by Dravo, will serve as part of the gas company's expansion project to supply needed fuel to Denver, Pueblo, and surrounding communities.

Fortson, Wilbee Appointed By James Pond Clark

James Pond Clark, manufacturer of Circle Seal precision valves, has announced the appointment of Charles Fortson and James Wilbee as representatives.

Fortson, representing San Jose-Fresno, Calif., area, will make his headquarters at the Power Transmission Supply Co., San Jose.

Wilbee's headquarters, representing the northern California-Nevada area, will be in San Francisco.

Both men are specialists in the fields of fluid controls and processing industries.

Worthington Names Hamill Kansas City Manager

John R. Hamill has been appointed manager of the Kansas City district office of Worthington Corp., according to an announcement by T. J. Kehane, assistant vice president and general sales manager for Worthington's Plainfield, N. J. Works' products.

Hamill joined Worthington in 1937. After assignments as estimator in the oil field product division at Harrison, and sales engineer attached to the Buffalo, N. Y. Works, he was appointed, in 1944, Gulf Coast manager of the company's marine division. From 1950 until the present, he has served as manager of Worthington's Wilmington branch office.

Fischer & Porter Creates Special Products Division

Creation of the special products division for development of special instruments and instrument components to contract specifications has been announced by Fischer & Porter Co., Hatboro, Pa., as the latest step in its planned program for expanding its service to industry. Edward H. Muhleisen, who has served both as field engineer and applications engineer for Fischer & Porter, has been appointed manager of the new division.

The company's 16 years of experience in the design and development of instrumentation for broad industrial use is now made available for solution of highly specialized instrumentation problems. Special projects will be handled to develop instrumentation for difficult applications relating to point-of-measurement or remote indication, recording, and/or control of such variables as flow, pressure, temperature, level, specific gravity, viscosity, consistency, and others.

Santa Fe Tank Names New District Manager

Dr. Joseph Lichtenstein, design engineer, was recently named eastern district manager for Santa Fe Tank & Tower Co. He will act as liaison for the company's mid-western and eastern offices.

Dr. Lichtenstein, known in the cooling tower field for more than 25 years, was instrumental in development of the new Santa Fe "MD-54" cooling tower. For the past 7 years he served as a consulting engineer in the heat transfer and hydraulic fields.

Santa Fe Tank has also announced that Jack Slough has joined the company at Los Angeles as assistant chief engineer. He will serve as liaison between Santa Fe factories and branch offices throughout the United States. Slough was also active in the development of the Santa Fe "MD-54" cooling tower.

Annin Co. Announces Three Distributor Appointments

The Annin Co., Los Angeles, has announced the appointment of Trident Engineering Co., San Francisco, as distributors for its line of Annin Domotor valves and other process equipment. Trident Engineering, under the direction of Robert Kenyon and George Skopacek, will represent Annin in the Bay area and northern California.

Ben McKalip Co., Tulsa, has been appointed by The Annin Co. to handle

its line in the Oklahoma and Texas Panhandle sections of the Southwest.

The company has also appointed Farnes & Martig Co. as representatives in Oregon and the western counties of Washington. Farnes & Martig have been serving this territory for many years as sales and application engineers in the automatic control field.

Tulsa Laboratory Installs Latest X-Ray Unit

J. W. Phillips, Applied Testing Laboratory, Inc., Tulsa, gets set to radiograph an oil drilling bit with a new Norelco X-ray unit which was recently installed. Central X-ray & Supply Co., Tulsa, representative of North American Phillips Co., Inc., installed the new MG 150 X-ray unit. This apparatus permits four types of X-ray tubes to be used. The photo shows a typical application for the Rod-Anode tube. Due to its design, it can be inserted in a pipe or vessel and a 360 degree weld may be X-rayed with one shot. The unit shown is capable of penetrating up to 2 in. of steel.

British Industrialists Visit O-C-T at Houston

Following the A.P.I. meeting in Chicago, D. B. Mirk, chairman of the board of Le Grande, Sutcliffe, and Gell of Rochester, Kent, England, and G. V. Sims, managing director of the English firm, were in Houston as the guests of John Maher, president of Oil Center Tool Co., to confer with Maher on a manufacturing agreement for producing O-C-T equipment in the sterling area.

While in Houston, Mirk and Sims inspected the facilities at Oil Center Tool and other industry-equipment manufacturers. Mirk stated that Le Grande has recently started an expansion program to extend and improve its distribution to every country in the sterling area.

Dollinger Names Chicago Area Representatives

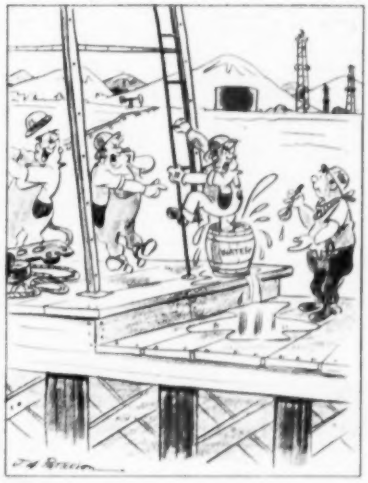
Appointment of Genn & Logan as district sales representatives in the Chicago area has been announced by Lewis L. Dollinger, Jr., sales manager of Dollinger Corp., Rochester, N. Y., manufacturers of Staynew filters for industrial and commercial use.

Earl Genn has been identified with sales-engineering activities for a number of years in the Midwest. He was formerly sales engineer for Furkert Co.

Frederick D. Logan is a graduate of University of Illinois with a bachelor of science degree in mechanical engineering. Prior to his association with Genn, Logan served as a mechanical engineer for various firms.

ADVERTISERS IN THIS ISSUE

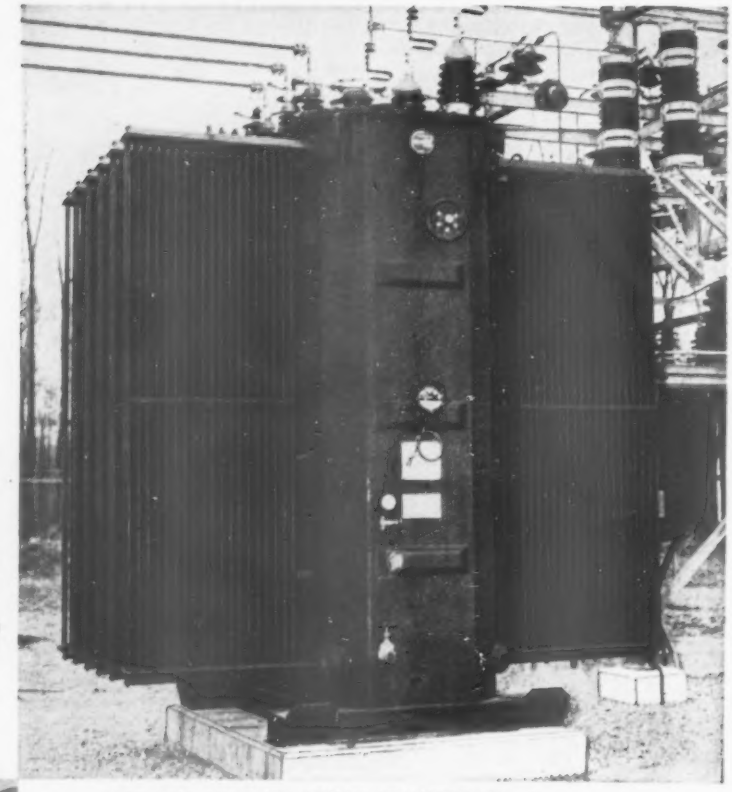
Ajax Iron Works 142
Alten Foundry & Machine Works, Inc. 30
Aluminum Co. of America 162
American Cyanamid Company 24
American Manufacturing Co. of Texas 4
Ampco Metal, Inc. 128
Armco Drainage & Metal Products, Inc. 55
Baker Oil Tools, Inc. 33
Bethlehem Steel Co. 153
Braden Winch Company 109
Brewster Company, Inc., The 83
Brown & Root, Inc. 69
Cannon Electric Company 148
Cash Company, A. W. 74
Cast Iron Pipe Research Associations 160
Chicago Bridge & Iron Company Inside Back Cover
Classified Advertising 167, 168, 169, 170
Cleaner Pipelines Co. 127
Cleveland Worm & Gear Co., The 12
Climax Engine and Pump Mfg. Co. 13
Core Laboratories, Inc. 8
Crose Manufacturing Co., Inc., M. J. 127
Crutcher-Rolfs-Cummings, Inc. 126
Darling Valve and Mfg. Co. 151
Davey, Paxman & Co. Ltd. 29
Dean Brothers Pumps, Inc. 151
Delta Engineering Sales Co. 110
Dowell Incorporated 38
Drilling & Service, Inc. 159
Drilling Specialties Co. 138
Enardo Manufacturing Co. 84
Fairbanks, Morse & Co. 2
Farris Engineering Corp. 97
Fluid Packed Pump Company 85, 86
Fluor Corporation, Ltd., The 6
Franks Mfg. Corp. Front Cover
Gaso Pump & Burner Mfg. Co. 101
General American Transportation Corporation 53
General Electric Company 122, 123
Georges and Associates, William S. 135
Goodyear Tire & Rubber Company, The 9
Grancell, I. H. 136
Grinnell Company, Inc. 7
Griscom-Russell Co., The 15
Guiberson Corporation 31
Gustin-Bacon Manufacturing Co. 132
H & M Pipe Beveling Machine Co. 117
Halliburton Oil Well Cementing Co. 3, 25
Happy Company, The 34
Harnischfeger Corp. 76, 77
Houston Contracting Company 115
Huey & Co., S. E. 128
Hughes Tool Co. Back Cover
Inferno Co., The 135, 151
International Harvester Co. 81
International Nickel Company, Inc. The 147
Johnston & Jennings Company, The, Division of Pettibone Mulliken Corporation 115
Kemp Mfg. Co., C. M. 21
Kennametal, Inc. 22
Kinzbach Tool Co., Inc. 161
Koch Engineering Company, Inc., The 108
Lane-Wells Company 32
Lonergan Co., J. E. 151
Lufkin Foundry & Machine Co. 100
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 113
Manning, Maxwell & Moore, Inc. 16
Marquette Metal Products Co., The 96
McKissick Products Corporation 26
Mercoid Corp., The 146
Metal Goods Corporation 14
Minneapolis-Honeywell Regulator Co., Industrial Division 23
Minnesota Mining & Mfg. Co. 111
Mission Mfg. Company 72, 73
Murphy, Frank W. 128
Murphy Diesel Company 156
National Airoil Burner Co., The 130
Nordstrom Valve Division, Rockwell Manufacturing Company 119, 120
Oakite Products, Inc. 162
Orbit Valve Company 133
Paris Distributor, Inc., Henry H. 118
Parkersburg Rig & Reel Co. 134
Peerless Supply Co. Inc. 128
Powell Valves 131
Radio Corporation of America 137
Raybestos-Manhattan, Inc., Manhattan Rubber Division 113
Raybestos-Manhattan, Inc., Packing Div. 28
Reed Roller Bit Company 154, 155
Regan Forge & Engineering Co. 26
Rubber Producing Facilities Disposal Commission 98
Seismograph Service Corp. 70
Southern Mill & Mfg. Co. 116
Steel Forgings, Inc. 130
Stewart & Stevenson Services, Inc. 149
Thermoid Company 27
Thomas Flexible Coupling Co. 144
Thompson Tank & Manufacturing Co., Inc. 160
Tube Turns, Inc. 19, 20
United States National Bank of Denver 145
United States Treasury Dept. 17
Vapor Recovery Systems Company, The 112
Victaulic Co. of America 82
Wagner Electric Corporation 172
Walker-Neer Manufacturing Company 140
Walworth Co. 5
Welex Jet Services Inc. 36
Western Supply Company 114
Westinghouse Electric Corp. 10, 11
Wyatt Metal & Boiler Works Inside Front Cover
York Co., Inc., Otto H. 150
Young Radiator Company 18



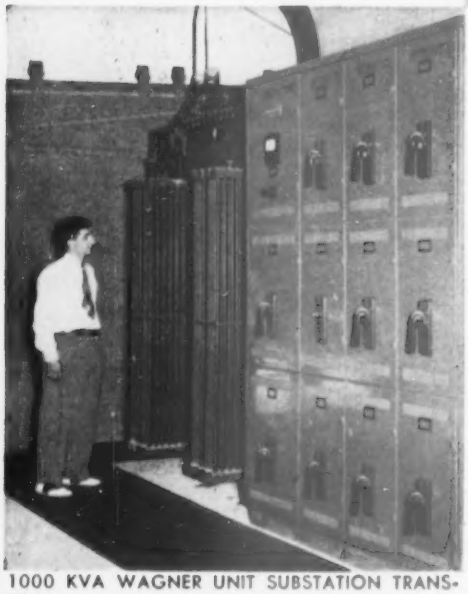
"And I think somebody set it there on purpose for when I came down!"

Wagner

Transformers used by Studebaker in new power distribution system planned for present and future needs



6000 KVA WAGNER POWER TRANSFORMER where power is received at 26.4 kv and is stepped down to 13.2 kv for distribution to the seven unit substations in the plant.



1000 KVA WAGNER UNIT SUBSTATION TRANSFORMER, at one of the five load centers that deliver 440 volt, three phase power to large machines and equipment.

New Jersey plant can convert from military to auto assembly production without extensive system changes!

The modern power distribution system at the Studebaker Corporation plant at New Brunswick, New Jersey has been planned with an eye to the future. While the plant is now manufacturing military jet engine parts, it will eventually become eastern auto assembly headquarters for Studebaker.

The power load is divided between seven load center substations, all equipped with Wagner Unit Substation Transformers, spaced 160 feet apart down the center of the building. In addition to insuring an adequate power supply for present purposes, this plan provides a dependable supply of power from short secondary feeders at any time in the future.

* * *

Why not discuss your next transformer installation with the Wagner engineer nearest you? There are Wagner branches in 32 principal cities. Bulletin TU-181 gives full information on Wagner Power Transformers, and Bulletins TU-13 and TU-56 tell about Wagner Unit Substation Transformers. Write for your copies.

WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

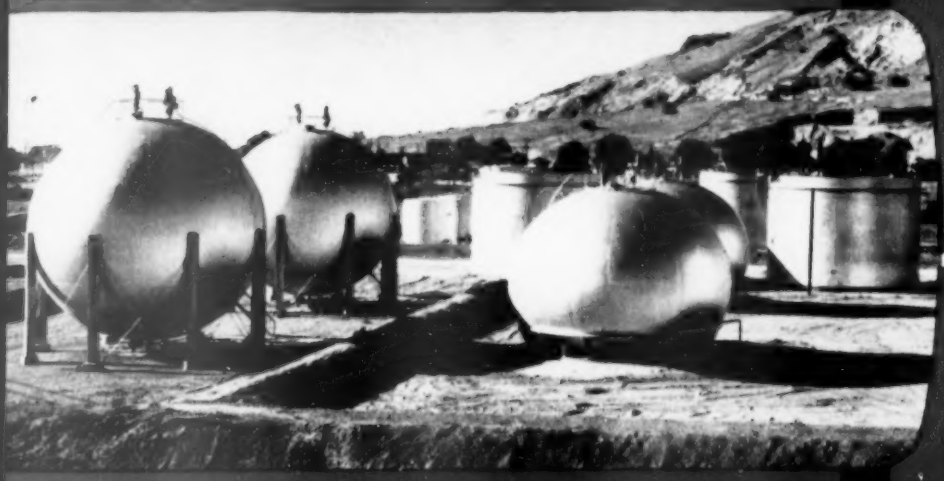
®Wagner Electric Corporation EST. WE 1891

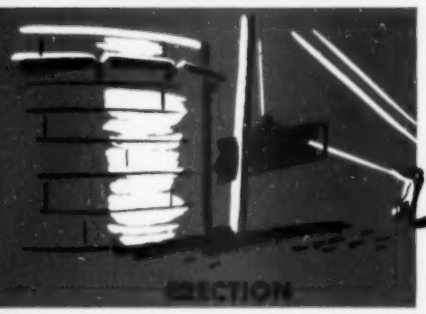
ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

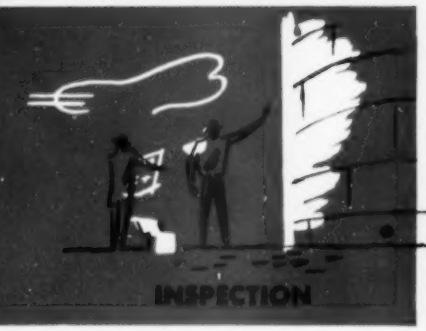
BRANCHES IN 32 PRINCIPAL CITIES

T53-9

Are Your Tanks Built in Accordance with the Specifications?







. . . they are when CHICAGO BRIDGE & IRON COMPANY builds them

Chicago Bridge & Iron Company *Field Welding Supervisory Service* sees that you get the best tank your money can buy. Every CB&I structure built has a Field Welding Supervisor assigned to it to oversee the cutting and grading of plugs, to check all welds and to help magnaflux, x-ray or stress-relieve welds if required by the specifications. Specially selected and trained for this job—he inspects welding equipment, checks welding techniques, qualifies welding personnel when necessary and helps train men to operate automatic welders. This service is included on *all* Horton structures at *no extra cost* to you.

In the endeavor to build better steel plate structures, Chicago Bridge & Iron Company carries on a never-ceasing search for improved design, fabrication and construction methods. As soon as new or improved welding techniques are discovered they are immediately put into practice . . . to assure you of a structure not just equal to, *but above and beyond*, your specifications. Write our nearest office for quotations.

CHICAGO BRIDGE & IRON COMPANY

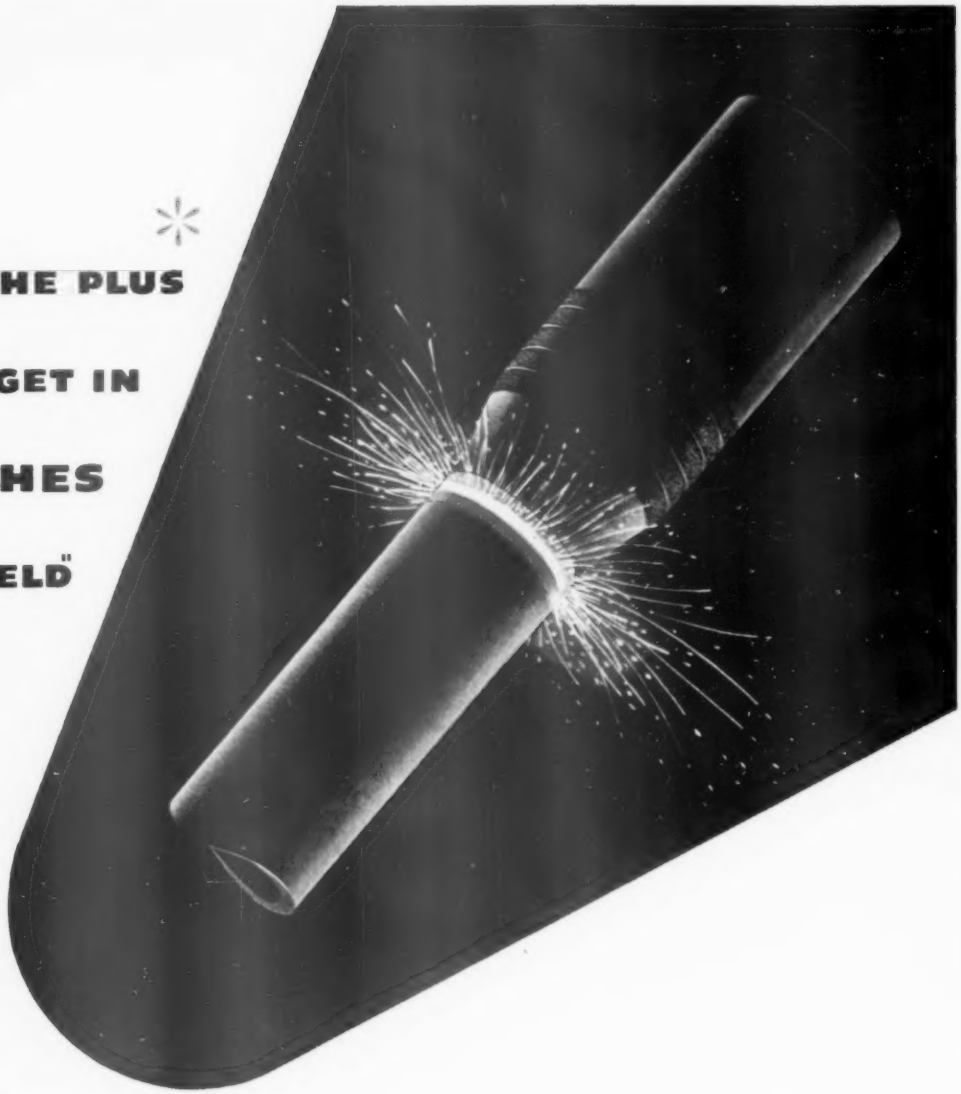
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY *and* GREENVILLE, PENNSYLVANIA

Atlanta, 3	2154 Healey Bldg.	Detroit, 26	1514 Lafayette Bldg.	Philadelphia, 3	1615—1700 Walnut Street Bldg.
Birmingham, 1	1536 North 50th St.	Havana	402 Abreu bldg.	Pittsburgh, 19	3228 Alcoa Bldg.
Boston, 10	1025-201 Devonshire St.	Houston, 2	2119 C & I Life Bldg.	San Francisco, 4	1554—200 Bush St.
Chicago, 4	2128 McCormick Bldg.	Los Angeles, 17	1523 General Petroleum Bldg.	Seattle, 1	1325 Henry Bldg.
Cleveland, 15	2204 Midland Bldg.	New York, 6	3347—165 Broadway Bldg.	Tulsa, 3	1308 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo, N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnie Tecnica Industria Petroli, Roma, Italy
Whessoe Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. General Justo, 275, Grupo 306, Rio de Janeiro, Brazil

THE PLUS YOU GET IN HUGHES "FLASH-WELD"



EXPERIENCE... years ahead of the field, Hughes Tool Company developed and perfected the Flash-Weld process for unitizing drill stems. In 1938, Hughes made the first Flash-Weld string. In the past fifteen years approximately one million Hughes Flash-Weld Tool Joints have been used in unitizing 30 million feet of drill pipe. This is more than enough to equip every rotary rig in the world with a complete drill string.

When you specify HUGHES Flash-Weld Tool Joints you get the industry's greatest Flash-Welding experience.

FLASH-WELD
A DEVELOPMENT
OF
HUGHES
TOOL COMPANY
HOUSTON, TEXAS